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# NAVAL POSTGRADUATE SCHOOL

## Monterey, California



## THESIS

THE DOD UNIT COST INITIATIVE: A NAVY  
OVERVIEW, ECONOMIC ANALYSIS, AND REVIEW OF  
BASE OPERATIONS SUPPORT COST ALLOCATION

by

Neil E. Seiden

December, 1991

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The DOD Unit Cost Initiative: A Navy  
Overview, Economic Analysis, and Review of Base  
Operations Support Cost Allocation

by

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Lieutenant Commander, Supply Corps, United States Navy  
B.S., University of Buffalo, 1978

Submitted in partial fulfillment  
of the requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

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## ABSTRACT

The purpose of this thesis is to provide an overview of the Department of Defense (DoD) initiative entitled unit cost resourcing and to review the Navy progress in implementing the unit cost concept initiative. An analysis of the unit cost concept is performed within the context of a microeconomic framework. Additionally the thesis will review the DoD method for allocating Base Operations Support (BOS) costs which are included as part of the unit cost goals. An example alternative allocation method was designed and used for illustrative and comparative purposes only. The history and background of unit cost are also provided.

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## I. INTRODUCTION

### A. PREFACE

From time immemorial, warriors have trained to do battle. Now, with global threats diminished, our own management systems largely have become the enemy; they are replete with inefficiencies and problems at every level. This thesis discusses a newly adopted approach to improving the financial management systems used for funding defense support activities. This approach is called unit cost resourcing. The objective of the unit cost resourcing system is to create a more "business-like" environment for Department of Defense support activities (e.g., supply and medical) and to encourage more efficient and effective production by providing new incentives to managers. Such changes are intended to improve provision of services and materia's supporting the operating forces. This chapter discusses current conditions facing the Department of Defense (DoD), how unit cost resourcing became adopted as the system of choice and previews the remainder of the thesis.

### B. WORLD CHANGE AND DOD

Dramatic world political changes and major domestic problems have reshaped our geo-political environment. In doing so, such changes have established the need for changes of equal dimensions within the United States military establishment. The Gramm-Rudman-Hollings Act set the stage for the Department Of Defense (DoD) budget

decline that started in 1985. Other recent and profound events have amplified public and Congressional cries for significant reductions in DoD force structure and funding. This has become popularly known as the "peace dividend."

Mikhail Gorbachev's Perestroika policy and the fall of the Berlin Wall in 1989 were among the first in the cataclysmic chain of events leading to the communist Party's radically diminished power and eventual collapse in Eastern Europe. These events helped enable passage of the Budget Enforcement Act (BEA) of 1990, which assures further DoD budget reductions until 1995 by establishing DoD budget targets. The Congressionally mandated budget limits translate to a five percent real decrease annually in DoD Budget Authority (BA) through fiscal year 1995.

Even more recently, the failed Soviet communist coupe attempt (September 1991) prompted President Bush to plan for the U.S. to unilaterally reduce nuclear arms (27 September 1991). This followed the announcement by President Gorbachev (4 October 1991) of similar Soviet nuclear arms reductions accompanied by a 20% reduction of the 3.7 million man Soviet army. To many, these events, combined with continuing huge federal deficits, have more intensely fueled the public and Congressional mandate for DoD to tangibly produce the "peace dividend." DoD is painfully learning to accommodate these political realities.

## **C. WHY THE DOD BUDGET DECLINES**

There are three primary reasons that DoD is the main focus for budget reductions, including: (1) the size of the DoD budget, (2) the change in the perceived threat and (3) the alleged inefficiencies within DoD.

### **1. DOD SPENDING IS DISCRETIONARY**

DoD appropriations have accounted for about 25% of the annual federal budget since 1984. However, those appropriations have constituted over 65% of Congressional "discretionary spending"<sup>1</sup> when entitlements, such as Social Security and social programs, are subtracted from the federal budget. Generally speaking, entitlement programs are politically "untouchable" because they affect a large sector of the population and recipients are often retired or people who require government-provided assistance. Thus, when Congress looks to reduce "discretionary funds," DoD bears a disproportionate share of reductions when compared to other agencies. This will likely continue for the foreseeable future.

### **2. THREATS FUEL NATIONAL SECURITY BUDGETS**

Historically, the DoD budget has been tied directly to the Congressionally perceived threat. A review of the DoD budget since 1930 (Figure 1) confirms this notion. Logically, defense spending increases substantially during wartime. But the

---

<sup>1</sup>Discretionary spending is defined as expenditures of public funds Congress appropriated and chose to make. These include most of costs of operating the government. Mandatory spending is outlays that may or may not be appropriated, but which the government is obligated to pay. Examples include Social Security, national debt service and military pensions.

subtle Cold War influence and advancing Soviet military technology and strength in the 1970s and 1980s convinced President Reagan and his advisors that Soviet intentions were malicious. President Reagan, Secretary Weinberger and the Joint Chiefs of Staff were able to persuade Congress that the U. S. did not have adequate defense resources to guard against potential communist hostilities. Thus, the DoD peacetime budget increased at the unparalleled real rate of nearly 12% annually. Real GNP increased at an average 2.5% during the same period. Simply stated, the DoD budget grew at a faster rate than any other agency budget or Departmental program.

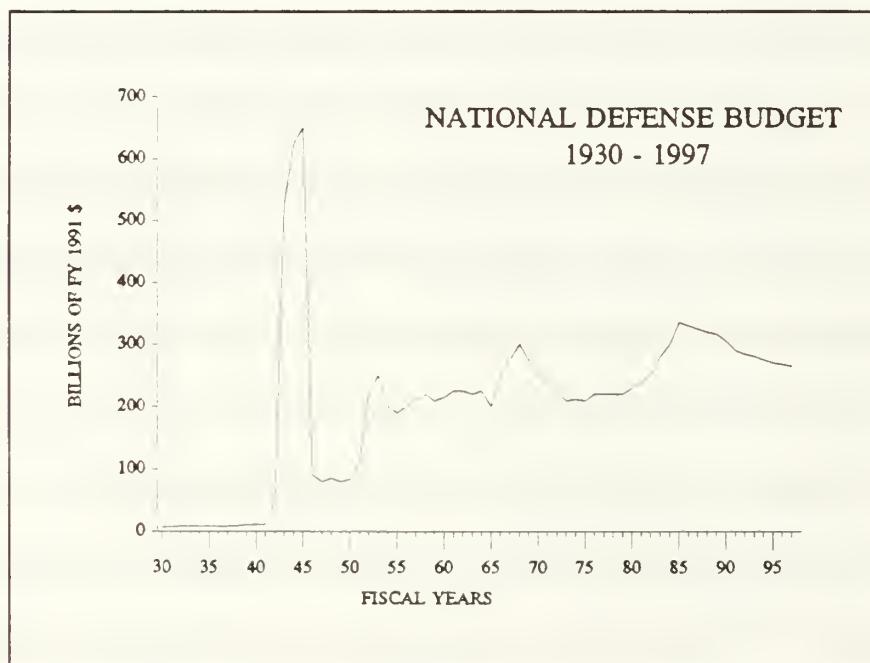


Figure 1

Given the current diminished Soviet threat previously discussed, the primary threat is now perceived as one of regional conflicts (e.g., Desert Shield/Storm). Many consider the risk of global nuclear war nearly non-existent. The battle lines have become budget

lines. It is obvious that political realities have inevitably mandated DoD resource reductions.

### **3. INEFFICIENCY MEANS LESS RESOURCES**

The last, and perhaps most serious threat to DoD funding is the continuing charge of DoD inefficiency and management problems. Inefficiency threatens DoD in two ways: inefficiency wastes limited resources that could be used elsewhere; and, while government operations are inherently inefficient (Stigler, 1963, pp.35-41), an increasingly common response to inefficient managers has been to reduce their resource allocations in hopes that the reduced resource (funding) base will encourage efficiency management. A startling example of a service directed action was when Navy Secretary Lehaman directed a \$500 million reduction in the Naval Industrial Fund (NIF) in 1985 after receiving a Coopers and Lybrand NIF audit report alleging poor resource management at public Navy shipyards. (While it is not clear the reduction itself was instrumental in improving NIF operations, the message sent to NIF activity managers was clear; improve efficiency or risk losing funds.)

### **D. RESPONSES TO DECLINING RESOURCES**

Essentially, there are three methods that organizations can exercise to respond to a declining resource environment: vertical cuts, horizontal cuts and efficiency improvements.

In a vertical cut, a function is totally eliminated so that resources associated with that function are no longer required. In the past, this approach has been used limitedly

within DoD, and usually after a buildup such as with Viet Nam. In today's environment, the vertical cut approach has become an important way for DoD to downsize force structure. But current issues, such as base closure decisions, have tended to be political in nature. DoD managers generally do not have unilateral authority for vertical cut decisions.

In a horizontal cut, all or many functions receive about an equal share of the resource reduction, as in the proverbial "5% across-the-board cut." This approach makes life harder for all; but those with "fat" will be less affected than those operating close to the margin. Horizontal cuts have been used frequently since 1985 in helping DoD reach its lowered budgets targets. This approach is often favored in political circles since no functions are eliminated. The responsibility for operating with lower budgets is transferred to lower level functional managers who must accomplish mission goals with reduced resources.

Good managers maintain mission success by implementing a third alternative, efficiency improvements. Efficiency improvements (also known as productivity improvements) are management or process changes intended to accomplish the same mission, but in a resource-wise manner that maintains or improves output (quantity and or quality) while using less resources. This approach is the focus of the unit cost resourcing system.

## **E. DECLINING RESOURCES AND MANAGEMENT**

In response to declining resources and recommendations for improvements raised in various forums, the Office of the Secretary of Defense (OSD)<sup>2</sup> and the component services are currently involved in a variety of major management reforms to improve operational efficiency and instill public confidence in the DoD establishment. These reforms are a direct result of the Presidential Productivity Improvement Plan (PIP), submitted to Congress in July of 1989. The PIP provided a comprehensive plan under which the executive branch would improve operations and reduce costs. A DoD-wide Defense Management Review (DMR) process assessed defense functions. As a result of the DMR process, DoD has estimated it will save 72 billion dollars in defense spending from FY 1991 through FY 1997.

DoD reforms approved by OSD in the DMR process have been distributed as Defense Management Review Decisions (DMRD). The DMRDs have initiated changes in basic ways of doing business. One of the primary focuses of the initial DMRD actions was OSD oversight and consolidation of similar, service-performed support functions. Some examples of those DMR decisions are the consolidations of functional areas for: accounting and finance, supply operations, computer centers, military training, civilian personnel administration, communications and commissary operations. Savings are expected to accrue through reducing personnel and process improvements. The DoD

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<sup>2</sup>OSD refers collectively to the civilian and military leaders in charge at the DoD level. DoD refers collectively to the military departments, the Organization of the Joint Chiefs of Staff, and the defense agencies. These organizations are referred to as the "components," and the military services are referred to as "component services."

closely monitors implementation of the DMR decisions and periodically reports progress to the President and Congress.

DoD has also implemented other significant management changes to improve efficiency. Among them, and the focus of this thesis, is a resource allocation system based on determining the cost per unit of output. This is called Unit Cost Resourcing.

#### **F. UNIT COST: A MANAGEMENT EVOLUTION**

For the DoD to meet the demands of downsizing while still accomplishing its national security mission requires skillful and coordinated management. DoD management has undertaken a productivity improvement effort by embracing the unit cost resourcing system. This system provides operating funds to support organizations (supply, medical, etc.) by establishing a producer-customer relationship between support organizations (producers) and operational military units (consumers). The producers "sell" their output at an established price (the unit cost) to the consumers. Thus, the support organizations "earn" the value (cost) of their output from their customers. This system is drastically different from the traditional DoD resource allocation system of providing support organizations fixed budgets to accomplish their missions.

The concepts behind unit cost are not new. Unit cost as an integrated DoD-wide system is an evolution of older ideas into current management systems. This approach to management is as foreign to some areas within the component services as a market-based economy is to the Soviet Union. None the less, both will become fully implemented realities within the next few years.

OSD leaders contend that the unit cost resourcing system will move the DoD operations and support functions to a more business-like setting. This action will enhance visibility of costs and contribute to improved resource management. Its implementation was urgent given the declining resource environment for DoD. Unit cost proponents also stated that managing DoD functions in a business-like manner will improve the DoD image and credibility to the public and Congress.

## **G. OBJECTIVES AND SCOPE OF THIS THESIS**

This thesis strives to attain four objectives: the first is to briefly review the history of defense resource allocation and budgeting systems. This review shows that ideas similar to the unit cost concept were considered as possible resource allocation methods since at least the early 1930s. This portion of the thesis is based on a literature review.

Secondly, the issues in implementing the unit costing initiative will be examined. This thesis will specifically focus on Navy implementation in three of the functional areas where OSD has directed that unit cost resourcing be used. These areas are supply depots, supply operations (combined into one discussion) and medical. Recruiting will be briefly mentioned. Though no less important, analyzing the other functions is beyond the scope of this thesis. This research is based on document reviews and interviews with key DoD and Navy leaders as well as field level personnel responsible for implementing unit cost resourcing.

Thirdly, the unit cost system will be analyzed within a microeconomics conceptual framework. This view will enable readers to understand basic principles of the unit cost

system from a theoretical economic perspective. This view may help explain practical uses and system limitations. This portion of the research is based on a combination of a literature review and a survey of DoD guidance.

Lastly, the thesis will review the OSD method of allocating Base Operations Support costs which will become part of an activity unit cost goal. This part of the research involved interaction with personnel at the Defense Manpower Data Center (DMDC) to understand the unit cost system design. Field research also provided data to compare to DMDC reports.

## **H. LIMITATIONS OF THIS THESIS**

Unit cost resourcing is, in its current form, a new DoD-wide concept. As such, much of what is presented in this thesis is a synthesis of reactions, impressions and predictions rather than an analysis of "hard data" leading to an irrefutable conclusion.

In developing and implementing unit cost resourcing, the OSD civilian leadership has expressed their view of how DoD may best meet the present, future and ever changing fiscal environment. Unit cost is a part of a much larger body of DoD-wide management and process changes intended to realign the military establishment to meet the challenge of a changing world. Changes in DoD management process have taken place at unprecedented speed. As a result, documentation is poor, fragmented and not well disseminated. One OSD analyst noted that changes are changed before the first change is published.

## **I. PREVIEW OF CHAPTERS**

The remaining thesis chapters are organized as follows:

### **1. Chapter II. HISTORY OF DoD RESOURCE ALLOCATION METHODS**

provides a historical perspective of how DoD allocated resources and traces the history of the unit cost concept.

### **2. Chapter III. THE UNIT COST RESOURCING SYSTEM** provides a

discussion of the theory and mechanics of the unit cost resourcing system.

### **3. Chapter IV. NAVY IMPLEMENTATION OF UNIT COST** provides a

general discussion of implementation problems and a review, by functional area, of actions and progress in unit cost implementation in Navy organizations. A discussion of current status and future direction is also provided.

### **4. Chapter V. UNIT COST: A MICROECONOMIC VIEW** reviews and

analyzes the unit cost concept within a microeconomic framework.

### **5. Chapter VI. BASE OPERATIONS SUPPORT (BOS) COSTS** discusses and

analyzes base operations costs and discusses changes from traditional practices to the new unit cost resourcing system.

### **6. Chapter VII. DATA ANALYSIS OF BOS ALLOCATION** compares and

discusses field data allocated by the DoD method to an example of an alternate allocation method.

### **7. Chapter VIII. SUMMARY** provides conclusions and addresses areas for

further study.

## II. HISTORY OF DOD RESOURCE ALLOCATION

This chapter provides a historical perspective of efforts to modify the DoD resource allocation system and describes some of the results of those methods.

### A. MILITARY BUDGETING PRIOR TO 1980

Formal budgeting and resource allocation did not exist in the United States government until the Budget and Accounting Act of 1920 was passed in 1921. Prior to that time, the Federal government allocated operating funds on a month-to-month basis. The Act provided for planned budgeting and resource allocation in the form of annual appropriations. (Kramer, 1979, p. 10) The Act, however, did not integrate military plans with their respective budgets. Until post-World War II, military officers planned battles; civilians planned budgets. Coordination between the two was poor, resulting in inadequate war preparations. (Mosher, 1954, pp.27-53)

The first major move to improve coordination between resource and military planning, and among all levels of the services, was the National Security Act of 1947. The Act created the Office of Secretary of Defense (OSD). It was amended in 1949 under the National Security Reorganization Act to create the Department of Defense (DoD) as an Executive Department. The 1949 amendment also downgraded the Military Departments, and elevated SECDEF to a cabinet level position. (Clark, 1969, p.174-175) Even so, the Military Departments acted in an independent and sometimes uncoordinated manner. OSD was unable to effectively manage the DoD components as an integrated

department until after 1958. The 1953 Reorganization Plan No. 6, expanded the OSD staff and authority; and, the Reorganization Act of 1958, shifted significant responsibility from the services to OSD and the Joint Chiefs of Staff. (Gates, 1989, p. 2) Both of these changes were based on Hoover Commission Report recommendations.

It is in the 1947-1953 timeframe that the basis for unit cost in its present form emerges. At about the time Congress established OSD, they also established the first Commission on Organization of the Executive Branch, more popularly known as the Hoover Commission, since former President Herbert Hoover chaired the Commission. Formed by the Lodge-Brown Act of July 1947, the Act defined a formidable and broad task for the Commission: "to review and recommend changes to the executive branch of government." (McGraw Hill, 1949, p.vi)

Among the hundreds of recommendations, the Hoover Commission Report urged that the Federal government adopt "performance budgeting." This was necessary, the Report stated, because "The Federal budget is an inadequate document, poorly organized and improperly designed to serve its major purpose..." (McGraw Hill, 1949, p.35) Describing the benefits of performance budgeting, the Report stated:

Under performance budgeting, attention is centered on the function or activity-on the accomplishment of the purpose-instead of on lists of employees or authorizations of purchases. In reality, this method of budgeting concentrates Congressional action and executive direction on the scope and magnitude of the different Federal activities. It places both accomplishment and cost in a clear light before the Congress and the public.

Clearly, the authors of the Report considered knowing the full cost of an activity important. The Report goes on to provide several specific examples (including one on

Navy medicine) and, within the concept of knowing total costs, described a "cost per" concept. Mr. W. J. McNeil, the first DoD Comptroller, implemented the Hoover Commission recommendations by making performance-based budgeting the keystone of the DoD resource allocation method. However, this performance-based budgeting did not concentrate on the "cost per" concept. Although the Hoover Commission seemingly defined the concept of unit cost, OSD took no specific actions to allocate fiscal resources on this basis.

Finding significant merit in the Hoover Commission budget and accounting recommendations, Congress passed the Budget and Accounting Procedures Act of 1950. The Act put into practice most of the first Hoover Commission Report budget-related recommendations. The second Hoover Commission, active from 1953-1955, found that while performance budgeting was generally used in most agencies, it "has encountered some difficulties and some congressional dissatisfaction with respect to program classification and the accounting support for them." (MacNeil & Metz, 1956, pp.50-55)

DoD budgeting underwent few substantive changes until Robert MacNamara was appointed Secretary of Defense (SECDEF). Secretary MacNamara introduced the Planning, Programming and Budgeting System (PPBS) in 1961, which K. C. Clarke and L. J. Legere believed to be the result of an evolving process since 1947. (Clark & Legere, 1969, p. 176) Describing PPBS, Aaron Walidavsky writes, "The general idea is that budgetary decisions should be made by focusing on output categories like government goals, objectives and end products instead of on inputs like personnel,

equipment, and maintenance." (Waldavsky, 1984, p. 186) PPBS remains the fundamental DoD planning framework today, similar in substance to its original form.

The final product of PPBS is the DoD input of fixed budgets by functional area to the President's Budget. Generally, Congress appropriates DoD budgets, with only marginal changes from the President's Budget. (Penner & Abramson, 1988, pp. 85-89) As such, PPBS is a prospective system. While there are many changes to budgets within the execution phase, the PPBS resource allocation mechanism only limitedly relates the execution and budgeting phases of the budget.

During the budgeting phase of PPBS, managers and organizations with fixed budgets historically have been evaluated on whether they successfully obligated their appropriated budgets, not on how much it cost to produce their output. Also, organizations risked receiving reduced budgets if they underspent their prior year appropriated funds. This was (and remains) a particularly serious issue for organizations that received one-year appropriations since funds are not available for obligation after the fiscal year ends.<sup>3</sup> In practice this resource allocation and management system encouraged the "use it or lose it" mentality, and was partially responsible for the need for top level managers to focus on productivity and efficiency. (GAO, 1984, pp. 3-10)

The next major change affecting DoD budgeting was the Congressional Budget and Impoundment Act of 1974. This Act made sweeping changes in the way Congress

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<sup>3</sup>Appropriations are Congressional Acts that enable an agency or department to (1) make spending commitments (obligations) and (2) spend money. There are different types of appropriations which remain available for obligation for as little as one year or as long as five.

analyzed and approved budgetary matters. (Penner, 1988, p.5) Among many other requirements, the Act required the President's Budget to display DoD budgets in terms of missions, establishing the mission budget concept. A General Accounting Office (GAO) Report describes mission budgets (GAO, 1980, p. 63):

A mission budget links an agency's "mission," to its activities and proposed funding. Descending levels of the structure then focus more sharply on specific purposes, needs, and programs to satisfy them. The new concept also illuminates the early (front end) decisions that control the purpose and direction of all programs.

While this concept conveys the concern that inputs should be linked to outputs, its intentions are far broader. Under mission budgeting, missions are defined in broad terms, such as "Strategic Programs," which cover programs in all service and agency components of the DoD. Such budgeting may provide a useful tool for Congressional oversight of DoD functions, but is of little use to lower level managers concerned with a particular system. Thus, DoD budget requirements must be translated from the functional service areas to the Congressionally required mission budgets. Mission budgeting does little to promote activity level efficiency or productivity, serving instead to provide information in an orderly display for Congressional review.

Problems of inefficiency continued to be recognized and in 1979 OSD reissued the Productivity Program Directive. According to DoD Directive 5010.31 of April 1979, Subject: DoD Productivity Program policy:

1. The DoD Productivity Program will focus management attention on achieving maximum Defense outputs within available resource levels by systematically seeking out and exploiting opportunities for improved methods of operation, in consonance with the Defense Preparedness mission.
2. Productivity measurement, enhancement and evaluation will be an integral

element of resource management; that is, planning, programming, budgeting, accounting and reporting system.

3. The DoD Productivity Program is a labor oriented program. Therefore, the primary basis for productivity assessment will be labor productivity measurement. Labor productivity measurement is a subset of total factor productivity or unit cost measurement. Where adequate cost information is available, total factor or unit cost measures may be used in addition to labor based productivity.

4. Productivity enhancement will focus on labor cost savings as well as reduction in unit cost of operations. The savings should be reutilized at the lowest organizational level practical to provide an incentive for management.

## **B. THE REAGAN YEARS**

In the early 1980s, as a consequence of the Reagan-prompted DoD budget growth, the huge national debt became the most critical challenge facing Congress and the President. On 30 June 1982, President Reagan signed Executive Order 12369. The EO created the President's Private Sector Survey on Cost Control (PPSSCC). The PPSSCC, better known as the "Grace Commission," since it was headed by J. Peter Grace, the President of Grace Industries, was tasked with determining and recommending deficit reduction measures. The Commission identified 784 issues and developed 2,478 associated recommendations consisting of 47 volumes addressing federal programs and operations government-wide. The Grace Commission estimated that the identified recommendations, if implemented, would save almost 425 billion dollars over a three year period.

A key issue of the Grace Commission Report was to improve and integrate executive branch accounting and budgeting systems and thereby improve the quality of information available for instituting management improvements, reducing costs, and minimizing agency exposure to fraud, waste, and abuse.

In a review of the Grace Commission Reports, (GAO, 1985, p. 12), the GAO agreed with the Commission's recommendations regarding the budgeting and accounting system, but stated "such initiatives would not produce the full range of improvements needed in federal financial management." The GAO report went on to provide a conceptual framework for financial management which included the following:

Budget and account on the same basis. Provide a common set of rules so managers can make valid comparisons between planned (budgeted) and actual (accounting) results.

Use accounting principles that match the delivery of services with associated cost. Use accrual accounting principles to provide policy makers and managers consistent information to compare costs or agencies with minimal interperiod distortions.

Measure outputs as well as inputs. Incorporate performance measurements that relate costs with outputs to determine if objectives are achieved at an acceptable cost.

As in the Hoover Commission Reports, GAO clearly defines a theme of relating inputs to outputs. Also, by invoking the notion of accrual accounting, GAO similarly included the concept of needing to know total cost.

While efficiency was at the heart of many DoD issues, so too was effectiveness. DoD leaders became concerned over the large amount of end-of-year (EOY) spending. One study found that during the last month of the fiscal year, the DoD obligation rate was one hundred and twenty percent of the monthly average. (Sherwood, 1977, p. 87) Many factors contributed to disproportionate end-of-year spending, including late appropriations from Congress, complexity of DoD acquisitions and the "use or loose it" actions described earlier. OSD felt that the rapid DoD budget growth could exacerbate the naturally high EOY obligation rate and cause Congress to accuse the military

departments of needless spending. In 1984, these concerns became so great that OSD required the service secretaries to personally grant approval for major contracts placed during the last month of that fiscal year.

In 1985, political pressures focused on the rapid budget growth and inefficiency of DoD. As defense outlays accelerated, the National debt climbed steadily. This environment enabled the Gramm-Rudman-Hollings (GRH) Act of 1985 to succeed. To address the rapid budget growth the Act attributed 50% of the GRH cuts to defense. (Penner & Abransom, 1988, p. 70) Although not a primary consideration for GRH, cutting the "military fat" would also encourage more efficient operations.

Foreseeing the need to improve productivity and efficiency in executive agencies overall, President Reagan issued Executive Order 12552 on 25 February 1986. This Order outlined a Productivity Improvement Program for the Federal Government. The Order sought, among other goals, to achieve a "20 percent productivity increase in appropriate functions by 1992." Federal agencies were required to submit a productivity plan; DoD called its version the Productivity Improvement Plan (PIP).

Responding to this Executive Order (EO) and DoD PIP, Mr. Donald Shycoff, then the Defense Logistics Agency's (DLA) Productivity Principal, implemented a "cost per output" system at DLA depots in 1987. DLA used the system to monitor and compare costs at the different depots. The system was implemented at the DLA inventory control points in 1989. The other DoD components also instituted cost per output systems. However, the cost per output systems were neither uniform nor centrally managed. They

were developed to satisfy directed reporting requirements rather than for use as management tools.

In April 1988, President Reagan issued Executive Order (EO) 12637 which superceeded EO 12552. EO 12637 was more ambitious in intent and requirements than EO 12552. It required an annual average 3 percent productivity improvement in appropriate functions by 1991. It also provided specific definitions of terms in the EO.

The EO:

...established a government-wide program to improve the quality, timeliness and efficiency of services provided by the Federal Government. The goal of the program shall be to improve the quality and timeliness of services to the public and to achieve an annual average productivity increase of 3 percent in appropriate functions.

Section 2 of the EO defines productivity, appropriate functions, public and outputs.

This thesis will use the definitions as provided in the EO:

Sec. 2. As used in this Order, the term:

(a) "Productivity" means the efficiency with which resources are used to produce a government service or product at specified levels of quality and timeliness;

(b) "Appropriate functions" means those agency program functions that produce measurable outputs in the form of services to the public;

(c) "Public" means a consumer outside the organization, such as citizens, businesses, State and local governments, other countries and/or their citizens, other agencies, the military;

(d) "Outputs" means products or services delivered to the public.

The sheer size and cost of DoD dictated that a concerted effort focusing on improving efficiency and productivity be implemented. As a federal agency, in FY 1990, DoD operated 485 domestic and 136 foreign or territorial installations that

accounted for 26.5 billion dollars of Base Operating Support costs.<sup>4</sup> (DoD Base Structure Report, 1990, pp. 6-7) Executive Orders 12552 and 12637 and the need to improve DoD resource management paved the way for DoD-wide unit cost resourcing.

### **C. POST REAGAN TO PRESENT**

President Bush, by a Presidential memo of 26 July 1989, selected agency-provided candidates for inclusion into an Executive Management By Objective (MBO) system. The goal of the Presidential MBO system was to help implement Executive Order 12637, aimed at improving productivity and quality in Federal government. OSD proposed implementing a cost per unit output system as part of the DoD response to the President's request.

Mr. Shycoff moved from DLA and became the Principal Deputy Comptroller for DoD in 1989. He envisioned the unit cost system could be a DoD-wide system modeled on the DLA system. In July 1989, the President submitted the Productivity Improvement Plan to Congress and made the Shycoff vision reality. By a DoD Comptroller memorandum of 10 August 1989 (Shycoff) formally announced to DoD components that OSD leaders were committed to the development and implementation of a Financial Management System based on cost per unit of output.

The memorandum summarized the problems with existing DoD component reporting and emphasized the need for managing with austere environment by saying:

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<sup>4</sup>Base Operating Support (BOS) is a category of the DoD component Operations and Maintenance appropriations. BOS is used for operating military installations.

Our review clearly indicates the lack of a consistent approach to this effort [cost per output] and a failure, for the most part, to incorporate this approach into the financial management system of the Department. ...we should use the same identification of inputs/outputs for making resourcing decisions and management decisions concerning performance, productivity, and quality improvement. ...we should use the same inputs/outputs for similar functions throughout the Department. The financial system should be the catalyst that supports all decisions...

If we are to minimize the impact of constrained resource levels, we must change the environment and culture that exists at many of our activities. We face the difficult task of convincing managers and workers that they should strive to reduce their costs, and thus, be able to meet mission goals with lower budgets. We can only get them to accept that goal when budgets are expressed in cost per output terms and we demonstrate to employees that they are not personally threatened, nor are the quality and performance of their organizations threatened by lower budgets. To the contrary, they should be rewarded for exceeding quality and performance goals, and reducing costs.

In 1989, the Defense Manpower Data Center (DMDC) in Monterey, California was designated the Central Design Agency (CDA). Tasking as CDA required DMDC to develop the standard DoD data base using the component data necessary to support the unit cost concept. Development of the system was under the direct control of the DoD Comptroller, Directorate of Management Improvement (DMI), located in the Pentagon, Washington, D.C.

From August 1989 to September 1990, with SECDEF's concurrence, the Deputy Secretary of Defense and Principal Deputy Comptroller repeatedly reaffirmed the DoD commitment to PIP and unit cost resourcing. Then, in a 15 October 1990 memorandum, the DoD Principal Deputy Comptroller declared "Implementation of the unit cost system of resourcing is underway with the execution of FY 1991 operation." (Comptroller of the Department of Defense, 1990, p. 1)

### III. UNIT COST RESOURCING

This chapter provides a description of the unit resourcing system, explains how the concept works and discusses Defense Management Review Decision 971 which includes certain DoD business areas in the unit cost system.

#### A. THE UNIT COST RESOURCING CONCEPT

Figure 2 graphically depicts the unit cost resourcing concept, which is theoretically simple. All costs incurred in a functional support area are accumulated to determine a

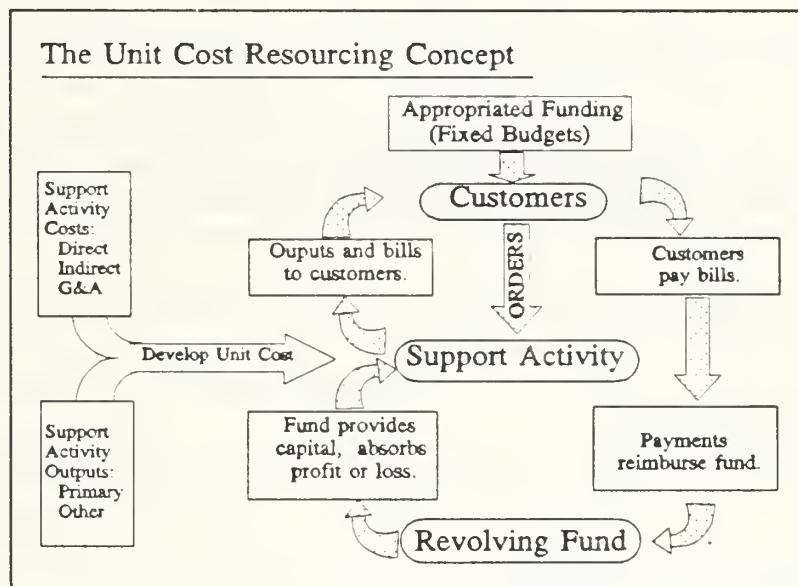


Figure 2

total cost. The total cost is then divided by the total expected work load or output. The resultant cost is a cost per unit of output, or the unit cost.

To use the unit cost as a resource allocation system, the calculated unit cost becomes the "price" activities receive for their output. "Consumers" pay the price (unit cost) which in turn becomes the operating funds or earnings for the producer or seller of goods and services. Producers get paid only for actual output, so a loss or profit from operations can result which is absorbed by "revolving funds," described later.

A DLA document, entitled "Unit Cost Resourcing Policies and Procedure," dated 15 October 1988, defines unit cost and makes an analogy to private industry:

Unit cost is nothing more than a concept that all of the costs incurred at an activity should find their way into some output measure. The idea is to use a "business-type" accounting or financial system approach. Private business must recover all of their costs through the pricing mechanism or they will soon be out of business. As a result, a body of accounting principles, practices and standards have been developed as to how to allocate costs to a product. The goal is to have each product or output bear as accurate a cost as possible, so that as the products or outputs fluctuate, the revenue and costs will remain in balance. Accounting practices also recognize that this must be done in a reasonable manner. Thus, those costs that cannot be easily identified to a product can be based on an allocation determination that will stand the test of reasonableness.

Professors David Harr and Jim Godfrey came to a similar conclusion in their recent study comparing private and public sector financial measurement systems. However, Harr and Godfrey do not indicate that the private sector bases their output prices solely on the unit cost, rather, it is an aid to cost recovery and the unit cost information is an important internal tool. (Harr & Godfrey, 1991, p. 9) They state:

Use total cost to determine unit cost measures. Senior managers generally included all direct and indirect costs in establishing unit cost goals and in evaluating subsequent financial performance for the organization as a whole. This approach is used primarily to ensure visibility of all costs incurred and to promote the sense that all organization functions, both operating and support, are ultimately responsible for the efficient and timely delivery of quality services. Private sector organizations also found this approach valuable to aid in recovery of costs in

pricing decisions wherever possible. In a government organization, depreciation and other indirect costs are included in an innovative use of total unit cost measure to recover capital funds as well as to evaluate performance.

The unit cost system contrasts with traditional PPBS fixed budget allocation system in that it becomes an active, ongoing part of the execution phase. Managers of unit cost activities are as responsible for planning for activity output as with the fixed budget. However, from a cost standpoint, managers must exercise constant flexibility in response to changes in demand for their output. In cases where average costs decrease with output and predicted demand falls short, inflexible managers will find costs exceed earnings.

While in principle the unit cost resourcing concept is easily described, in practice there are significant complicating factors. For example, if an activity has one identifiable output then the unit of output is homogenous and easily measured. Few real-world organizations have only one unique output; most are heterogeneous with multiple types of output, often measured in different units. Another factor is that costs can be difficult to measure and vary in nature. This is especially true when costs are spread across the various types of dissimilar outputs. In some cases, costs must be allocated on a basis not associated with the output itself. An example of this is allocation of costs of common services such as fire department, security force or personnel administration costs.

The following three subsections discuss costs and outputs in the unit cost system context and ties these to the accounting concept of cost-volume-profit (CVP).

## 1. COSTS

The unit cost concept captures the three traditionally measured business costs to determine total costs of operations: direct costs, indirect costs and general and administrative (G&A). A review of the American Institute of Certified Public Accountants definitions of direct, indirect and G&A indicate that the OSD UNIT COST RESOURCING GUIDANCE defines these costs, for the most part, in accordance with generally accepted accounting principles.

Direct costs are those costs directly traceable to an end output and whose consumption varies directly with output. Accountants refer to costs that vary with output as "variable costs." Costs that are independent of output are generally referred to as "fixed costs."

Indirect costs are mission costs associated with more than one but not all outputs. Indirect costs may or may not vary with output and therefore may be variable, fixed or a combination of these costs.

General and administrative costs (G&A) are essentially overhead costs. G&A costs benefit all functions and it is difficult to determine the relationship between a G&A cost and a particular output. G&A also may be fixed, variable or both.

It is important to note that while the UNIT COST RESOURCING GUIDANCE recognizes direct, indirect and G&A costs, as discussed above, the unit cost concept treats all costs as variable costs. The UNIT COST RESOURCING GUIDANCE states "until such time as fixed and variable costs are distinctly definable and supportable, earnings will fluctuate with work load as though all costs are variable... "

## **2. OUTPUT**

Executive Order 12637 states that "appropriate functions" were those with "measurable outputs." This is an essential element to implement a unit cost resourcing system. Within the context of the unit cost system, work load and output are synonymous.

The goal of the unit cost concept is to relate all support activity costs to an output. Outputs that reflect the major mission for organizations are known as "Primary" outputs. Outputs not related to the primary mission, but otherwise still required, are called "Other" outputs. Work load/output measures are discussed further in Chapter IV.

## **3. THE COST-VOLUME-PROFIT MODEL**

Production activities operating under traditional fixed budgets have no opportunity to generate profit or loss. Such activities may under or over obligate a fixed budget, but this is conceptually different than profit or loss which arise as a result of the difference between total earnings and total costs.

Under the unit costing concept, producers earn a unit cost calculated with the intent that producers will "breakeven" at the end of the fiscal year.<sup>5</sup> Since the unit cost system funds production activities in a manner similar to the way private sector firms

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<sup>5</sup>While the notion of "breakeven" in the government seems intuitively correct, economists believe that the government should provide a service level that maximizes the value of the resources used. This requires producing output at a point where the marginal benefit of output is equal to the marginal cost of input, which is not necessarily a breakeven point.

generate revenues, profits and losses are not only expected, but inevitable. This idea can be visually demonstrated using the cost-volume-profit model (CVP) or breakeven analysis technique commonly employed in the public and private sectors.

Unit cost can be expressed symbolically using the CVP model (adapted from Harr and Godfrey, 1991, pp. 61-62) as:

$$TE = TC$$

where

TE = Total earnings from activity output

TC = Total costs incurred in producing each output

For each output

$$TE = UC * WL$$

$$TC = TDC + TIC + G\&A$$

where

UC = Unit cost

WL = Work load or quantity of output

TDC = Total direct costs

TIC = Total indirect costs

G&A = General and administrative allocated costs

The general form of the unit cost then is

$$UC = \frac{(TDC + TIC + G\&A)}{WL}$$

Figure 1 displays the CVP graphically. Note the difference between the graphic view and the symbolic representation is that total cost is the sum of direct, indirect and G&A costs. As discussed in section A.1., costs can be defined in terms of

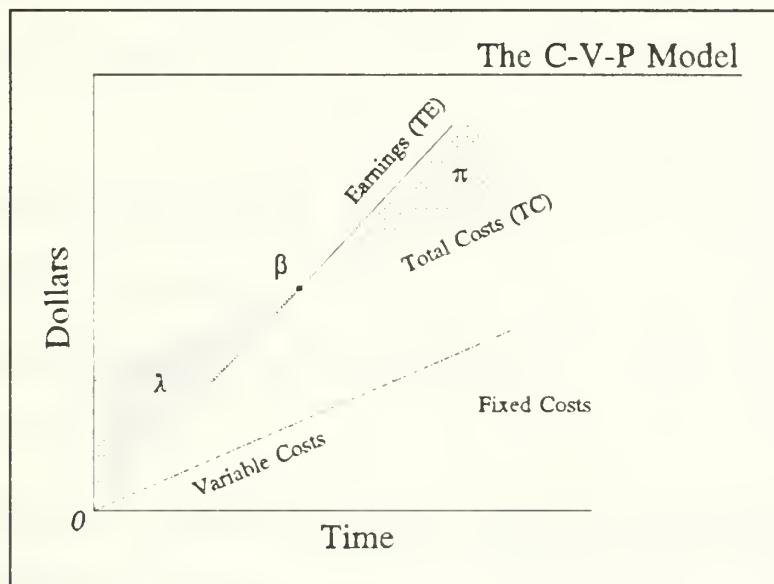


Figure 3

fixed or variable costs, or a combination of the two, and total costs are equal to all fixed plus all variable costs.

The breakeven point,  $\beta$ , is the point at which neither a profit nor loss occurs. Points in region  $\lambda$ , represent losses and points in region  $\pi$ , represent profits. Profits and losses have been a part of military stock and industrial fund activities operating within revolving funds for over 40 years. The revolving fund concept enables unit cost to be used as a resourcing system. This concept is included in the discussion of DMRD 971, found in section C, below.

## B. BENEFITS OF THE UNIT COST CONCEPT

OSD leaders envision unit cost to have benefits in five dimensions. In particular, unit costs should help to: (1) improve operations, (2) evaluate performance, (3) evaluate budgets, (4) support budgets and (5) improve decision making. The UNIT COST RESOURCING GUIDANCE stipulates that the cost reductions are not to come at the expense of quality. The benefits are briefly summarized:

Improved operations are expected to come about as a result of producers more carefully managing their operations to minimize costs.<sup>6</sup> Consumers, who will pay higher prices for fully costed goods will economize, buying only essentials or seeking alternate sources offering services at a lower price.<sup>7</sup>

Personnel performance evaluations will be more meaningful because of standardized cost methods and comparability among similar organizations of the different services.

Budget evaluation, support and planning will become simpler and more consistent. Similar performance measures will apply to diverse organizations.

Decision makers in consuming and producing activities will know the full cost of resources they consume and can make intelligent decisions that integrate cost as an important consideration. OSD managers can more easily assess impacts of important

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<sup>6</sup>The terms producer and seller are used interchangeably in this thesis. The terms refer to activities who provide output (e.g., supply activities) in the form of goods or services.

<sup>7</sup>The term consumers and customers are used interchangeably in this thesis. The terms refer to activities (e.g., operational units) who purchase output from producers.

decisions and unit cost information will provide additional data on which to base decisions such as base closures and realignment.

### **C. FUNCTIONAL AREAS IN THE UNIT COST SYSTEM**

The OSD Memorandum of 15 October 1990 which announced unit cost implementation, also provided the UNIT COST RESOURCING GUIDANCE. The UNIT COST RESOURCING GUIDANCE stipulated the following areas would be under unit cost starting in FY 1991:

1. Supply Operations (Inventory Control Points),
2. Supply Depots,
3. Recruiting,
4. Medical Care,
5. Military Training, and
6. Commissaries.

Previously, Depot Maintenance was included in the unit cost system. However, it was excluded from the unit cost system because this area already works under a system for capturing costs against a standard job order.

Base Operation Support (BOS) costs were also originally intended to be under unit cost resourcing. However, these costs were excluded from the unit cost resourcing system as a distinct category since they are now computed as part of the overall cost of output. Thus, all unit cost calculations will include an allocated share of BOS costs. BOS will be discussed further in Chapters VI and VII.

In reality, the only functional areas that actually came under the unit cost resourcing system in FY 1991 were supply operations and depots. The other areas listed have been the subject of ongoing OSD sponsored task forces and DMDC study, but, for a variety of reasons, the work had not progressed to the point of actual implementation in FY 1991.

Since the issuance of the UNIT COST RESOURCING GUIDANCE in October 1990, the Deputy Secretary of Defense approved Defense Management Review Decision (DMRD) 971 (February 1991). DMRD 971 represents a major step in the continuing evolution and implementation of unit cost resourcing. It amplifies and confirms the basic tenants of the UNIT COST RESOURCING GUIDANCE, while providing a plan and timetable in which other DoD support functions (business areas) will be included in unit cost resourcing. The next section discusses DMRD 971.

#### **D. DMRD 971: THE DEFENSE BUSINESS OPERATIONS FUND**

In accordance with the DoD Principal Deputy Comptroller letter of 15 October 1990, unit cost resourcing was reported as officially implemented in all DoD supply depots and ICP starting in October 1990. Defense Management Review Decision (DMRD) Number 971, approved by the Deputy Secretary of Defense on 2 February 1991, provides a plan, mechanism and timetable for expanding the implementation of unit cost resourcing.

## 1. DMRD 971 INITIATIVES AND ACTIONS

DMRD 971 expands unit cost resourcing into new business areas and reduces DoD budget requirements by:

- (1) Establishing a revolving fund<sup>8</sup> in FY 1992 called the Defense Business Operations Fund (DBOF). Revolving fund activities experience profit and loss but adjust the subsequent year product price (or rate charged to customers) to attain the goal of a zero Net Operating Result (NOR). The revolving fund thereby provides the mechanism which will allow support functions to operate under the unit cost resourcing framework;
- (2) Providing an estimated timetable to include activities previously operated on fixed budget basis into the DBOF;
- (3) Consolidating other existing revolving funds into the DBOF to improve cost visibility and financial reporting;
- (4) Establishing a new revolving fund in FY 1993, called the Military Personnel Revolving Fund (MPRF), which provides the mechanism to recover all of the costs required to support the military member. The fund will include the cost of: military pay and benefits, medical, training, dependent education, recruiting, family housing, permanent change of station and subsistence-in-kind, and will operate under the same business principles as the DBOF;

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<sup>8</sup>A revolving fund is a non-expiring, self renewing appropriation that provides a financial corpus to finance support activities' operations. Consumers' purchases from a revolving fund activity reimburse the fund, making more capital available for new output.

(5) Instituting Capital Budgeting in both of the new revolving funds to finance equipment<sup>9</sup> for the businesses included in those funds, allowing the businesses to recover the investment costs overtime;

(6) Reducing the DoD request for Budget Authority as shown in Table 1.

TABLE 1

Millions of Then Year Dollars					
<u>FY 92</u>	<u>FY 93</u>	<u>FY 94</u>	<u>FY 95</u>	<u>FY 96</u>	<u>FY 97</u>
72.0	168.0	404.0	1,625.0	2,471.1	2,950.6

The reductions are a result of estimated saving from implementing the DMRD 971 recommendations. The reductions shown in Table 1 represent an expected one-percent annual savings as DoD support activities becoming more efficient.

## 2. DMRD 971 GOALS

The two-fold goal of DMRD 971 is to change DoD financial systems to:

- a. Provide better tools and information to employees at every level of the support establishment;
- b. Provide better information to decision makers at every level.

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<sup>9</sup>The Capital Budgeting aspect of unit cost resourcing has not enjoyed Congressional support. OSD intended the capital budgeting aspect to include all depreciable assets, such as equipment meeting investment criteria and buildings. Congress is allowing OSD to include only the equipment portion of capital budgets in the unit cost resourcing system and has specifically precluded military construction (MILCON) costs from the system. In an April 1991 GAO report on industrial fund capital budgeting, the GAO stated that "DoD's capital equipment policies and guidance still lack adequate controls to correct longstanding problems identified in our previous reports."

The long range goal is to have all DoD support activities under the unit cost resourcing system. However, three criteria must be met in order to move functional areas into the DBOF or MPRF: (1) have identified outputs; (2) have a cost accounting system that relates costs to outputs; and, (3) be able to identify customers of the business.

### **3. DMRD UNDERLYING ISSUES**

A summary and discussion of the principles underlying DMRD 971 follow:

Hidden Costs. Historically, many DoD support activities, such as medical, training, some supply and some weapon platform maintenance (specifically aircraft) and base operations support costs were budgeted and justified separately from the operating forces they support. These costs amounted to approximately fifty-percent of the DoD budget and were not reflected in cost of weapons systems or the forces they support. Providing fixed budgets to producers instead of consumers makes it impossible for decision makers to determine the "real" cost of the operational forces.

Improved Accounting and Budgeting. The financial management system should allocate support costs using business accounting methods. This is necessary so that DoD costs are reflected in the cost of developing and deploying the operating forces to the maximum extent possible. The output of DoD is represented by operations of its military forces. Currently (prior to FY92), these costs are usually allocated to the support activity that incur the costs.

Additionally, a financial management system should help producers provide support more efficiently. A system based on cost-per-output for support areas, provides financial data to top management to measure efficiency and provides important

managerial information for all levels of management by focusing attention on costs of outputs.

Operational Control of Operations Support Funding. All appropriations for equipping and operating the military forces should be provided to the organizations responsible for the management and direction of those forces. Support services should be provided on a reimbursable basis rather than by direct appropriation.

Limitation on Revolving Funds Approach. A primary limitation in a financial management system based on unit cost includes the inability of the support establishment to adjust "fixed" costs to changes in demand and the noncompetitive nature of many of the businesses. The use of revolving funds should help to overcome the first limitation. Revolving funds enable DoD to provide a corpus to cover variations in cost during execution, while fixing the prices to the costumers.

Advantages of Revolving Funds Approach. Stabilized output prices will enable program execution as approved by the Administration and Congress. Profits and losses in the revolving fund will be reflected in the setting of output prices for the following fiscal year. Congress will continue exercising control over investment items, by specifically approving such capital purchases.<sup>10</sup>

Consolidating all of the costs of a business area will provide management better visibility of costs. Managers can focus on the unit cost and will have authority to trade off between elements of cost.

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<sup>10</sup>Investment, in the DoD financial context, refers to material items costing more than \$15,000 which are not centrally managed.

The lack of competitive incentives to reduce costs within a supporting activity will be overcome by an environment that puts a premium on quality and encourages managers to reduce costs. In contrast, traditional systems rewarded managers who fully obligated budgets without regard to the value of output. Under the system described, customer demands drive production. Customers make trade off decisions based on cost and need, more effectively using their resources. Top level decision makers will have better information on weapon system costs. All DoD managers will be encouraged to reduce costs and the overall support costs for the Department can be significantly reduced.

#### **4. DMRD UNDERLYING PRINCIPLES**

The basic principles behind the unit cost system and DMRD 971 can be summarized as follows:

- a. All support activities will be funded on a reimbursable basis, and to the maximum extent possible, all costs will be recovered, including military personnel costs;
- b. Customers will be able to make performance-cost trade offs by knowing the cost of the alternatives available;
- c. Alternatives must be built from the bottom up. Opportunities for discretionary decisions should be identified at every level;
- d. There must be uniform activity pricing principles. Prices must be established on the basis of cost accounting standards;
- e. Producers must meet unit cost goals. Management at every level must establish goals that each cost center should be expected to meet.

## **E. GAO COMMENTS ON DBOF**

On April 9, 1991, in testimony to Congress, Mr. Donald Chapin, Assistant Comptroller General of the General Accounting Office, presented the GAO views on DBOF. Mr. Chapin stated (GAO, 1991, pp. 1-2):

We support Defense's initiative to adopt a more businesslike approach to the management and operations of its support functions. This approach would focus the attention of management at all levels, on the cost of carrying out Defense operations. At the present time, neither Defense nor the Congress is aware of the total support costs of operating components, such as Air Force fighter squadrons or Navy aircraft carriers. In the past, management focused on the elements of cost rather than on total costs of operations. This initiative could increase the incentives and tools to manage existing resources with greater efficiency by identifying the total costs of operations and highlighting the cost implications of decisions made by managers. In today's environment of decreasing budgets and an increasing federal deficit, it is vital that Defense spend the funds appropriated by the Congress in an efficient and effective manner.

Despite support for making Defense more business-like, GAO recommended that DBOF not be implemented in FY 1992, for a variety of reasons. Prior to implementation, GAO contends that DoD must:

- (1) Develop comprehensive and detailed policies and procedures to govern DBOF operation;
- (2) Develop reliable cost accounting systems to properly capture and report cost data for each business area;
- (3) Ensure that systems in place accurately bill customers the full cost of support service to fully recover production costs;
- (4) Ensure that systems in place accurately account for intrafund transfers;

- (5) Develop performance measures to be used by managers to evaluate the resources entrusted to them;
- (6) Capture DBOF-related capital investment costs;
- (7) Prepare a test of the DBOF for a specific area; and,
- (8) Prepare auditable financial statements for oversight and control of the DBOF and customers' appropriations to buy from the DBOF.

Despite the GAO objection to implementing DBOF in FY 1992, OSD leaders successfully demonstrated that sufficient controls are in place to allow DBOF (and unit cost) implementation. However, one area where Congress did limit OSD from fully implementing the unit cost concept was that of Capital Budgeting, discussed on page 43.

## **F. UNIT COST IN PRACTICE**

To arrive at unit cost goals, DMDC accumulates direct and indirect costs associated with the output for each functional area. DMDC compiles costs from accounting tapes they receive from regional accounting centers, makes overhead and Base Operations Support allocations and adds these to the other costs to determine the total cost for each output in each functional area. OSD provides DMDC with a predicted base level of output. This is divided into the accumulated total cost to determine the unit cost rate. Appendix C graphically displays the DMDC unit cost program and the steps necessary for unit cost calculation.

The unit cost rate that DMDC calculates is for a functional area within a DoD component. For example, assume DMDC is calculating the unit cost rate for Navy supply depots. All costs from all depots are included to determine the total cost of all Navy depots. The total cost is then divided by the total expected Navy depots output to arrive at a unit cost rate that represents an average for all Navy supply depots.

The above method provides a top level view of Navy depots, but the calculation loses significance among comparisons of individual depots. This is why OSD requires each DoD components receiving unit cost goals at the component level to distribute (allocate) the unit cost goal among all activities in the component functional area.<sup>11</sup> OSD leaders contend that the components, and not OSD, possesses the detailed information necessary to properly assess the unit cost goal on an activity basis within a component functional area. Properly allocating the unit cost goal among the activities within a functional area will recognize individual differences among activities that could give rise to substantially different operating costs. For example, the mix of items stored at depots could significantly affect the cost of operations (e.g., ship anchors versus paper clips). At the component level, OSD ensures all similar functions have costs accumulated and unit costs calculated in a consistent manner. OSD can then use the unit cost data to make inter- and intra- service decisions.

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<sup>11</sup>For example, DMDC provides the Navy a single unit cost goal for Navy supply depots. The Navy has the responsibility (assigned to the Commander, Naval Supply Systems Command) of determining how the Navy supply depot unit cost goal should be distributed (split) among the depots.

Allocating the unit cost goal is also necessary in order for DMDC to track activity specific earnings. DMDC reports the costs and earnings information by activity and functional area by component in monthly reports generically known as "unit cost reports." For depots, the reports are officially titled "Depots Cost, Manpower and Workload Analysis Report."

The unit cost rate is fixed at the beginning of the year, based on prior year costs and the estimated level of business for the current year. Over the fiscal year, OSD may direct DMDC to revise the unit cost based on continuing analysis and changing conditions. The earnings value which each activity receives is based on actual units of output multiplied by the DMDC-calculated unit cost. In the simplified discussion of the unit cost concept (section A), the earnings value would also be equal to the amounts customers pay for the output. In practice, this is not always the case as the method of determining the amount consumers pay and the amount support activities receive differs by functional area. Even with differences between price and unit costs (such as at supply depots), OSD officials have as a goal zero a Net Operating Result (NOR). Reflecting this objective, prices and unit cost goals are adjusted at least annually to incorporate the prior year profit or loss.

At the beginning of the fiscal year, each activity receives an obligational target which is based on the expected unit cost times the predicted work load. This number establishes the initial obligational authority against which an activity charges its costs of operations. At the end of the fiscal year, the actual work load is multiplied times the

final unit cost to determine the total earnings for the activity.<sup>12</sup> The total earnings establishes maximum obligational authority for each activity. By law, a government activity is not allowed to exceed the approved budget. Operating under the DBOF revolving fund provides unit cost activities an umbrella for which the Title 31, U.S. Code (1517) responsibility rests with OSD.

The initial DMDC-calculated unit cost is based on historical cost data rather than future plan or expected data. This approach forces activity managers to carefully consider each cost object and to ensure each cost object contributes to the efficiency of the function.<sup>13</sup> Unnecessary costs drive production costs to levels which insure that the producer will not receive sufficient earnings to cover costs if actual sales fall short of the predicted demand. A major goal of unit cost resourcing is to encourage managers to continuously improve productivity and reduce cost.

While producers must carefully watch costs, so too must consumers. As the unit cost system is implemented, support activities migrate from fixed budgets to unit cost resourcing. Budget based transfers will take funding away from support activities (producers/sellers) and provide these funds to operational activities (consumers/customers). Consumers will pay for each unit of output which theoretically covers all resources consumed in producing that output. The unit cost concept is based

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<sup>12</sup>The unit cost is subject to change. Customers pay at the rate established at the beginning of the year. Producers receive earnings based on a potentially variable unit cost.

<sup>13</sup>A cost object is any activity for which a separate measurement of cost is desired. (Horngrin, 1987, p. 21)

on the premise that if decision makers (consumers in this case) bear the full cost of their decisions, then they will economize and make better financial decisions when using their own resource funds.

One Congressionally imposed limitation on the OSD vision of total cost recovery within the unit cost concept is in the area of Capital Budgeting. OSD leaders planned that unit cost would fully recover the cost of all depreciable capital investment assets, such as equipment and buildings. Congress is allowing OSD to include only the equipment portion of capital budgets in the unit cost resourcing system and has specifically precluded military construction (MILCON) costs from the system.

In an April 1991 GAO report on industrial fund capital budgeting, the GAO stated that "DoD's capital equipment policies and guidance still lack adequate controls to correct longstanding problems identified in our previous reports." Despite corrections DoD may make in GAO-identified "longstanding problems," it is unlikely OSD will get Congressional consent to allow DoD managers to unilaterally make construction decisions and to eliminate the MILCON appropriations. This is so for two reasons: (1) making the MILCON appropriation part of the DBOF could obscure MILCON visibility and reduce Congressional oversight; some believe this would enable DoD to build without Congressional project authorization; and, (2) traditionally, MILCON projects (like base closures) have been especially political; construction projects are among the tangible ways Members of Congress can demonstrate their efforts on behalf of their constituents. For these reasons, Congress is not likely to let slip from their direct control MILCON oversight.

The unit cost resourcing system has intuitive appeal because DoD resource users are generally unaware of the full cost of resources consumed in producing primary outputs. Unit cost strives to provide a full accounting of all costs; under the traditional budget based system personnel, facilities and equipment are provided "free" (no cost) to activities.

In pre-unit cost production, the cost of activities with fixed budgets were not allocated to output, thereby heavily subsidizing consumer prices for output. Two examples of such subsidies include: (1) the cost of operating supply ICPs and depots were excluded from the cost of material consumed; and, (2) the cost of military personnel salaries and fringe benefits was not included and often overlooked in decision making. With artificially low prices, consumers regarded output as free or inexpensive. This led to suboptimal allocation (waste and abuse) of DoD produced output in both consumer and producer organizations. This concept will be explored more fully in Chapter V.

#### **IV. UNIT COST: IMPLEMENTING A STRATEGY**

This chapter discusses the unit cost concept in the context of a new DoD strategy and provides views of unit cost and implementation issues from several perspectives.

Information regarding unit cost implementation was collected from personal interviews, telephone conversations and document reviews conducted at field offices and organizational headquarters.<sup>14</sup> The issues raised by field level managers reflect the personal and professional views of those interviewed, and do not necessarily indicate systemic problems. Interviews with senior Navy and OSD personnel were intended to ascertain the official views of those organizations, but personal views were also expressed in some cases. To the extent possible, the issues raised were discussed with the DoD Principal Deputy Comptroller or members of his staff.

##### **A. THE UNIT COST CONCEPT: A SYSTEM AND STRATEGY**

The unit cost concept represents more than a change to accounting procedures, new computer programs or other general managerial changes. It is a new strategy which OSD leaders believe is the correct response to integrate DoD management into the current and future environment facing DoD. When fully implemented the unit cost concept will provide a financial system for planning, operating, controlling and measuring the performance of DoD support activities. The unit cost concept clearly

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<sup>14</sup>The author has made every attempt to fairly describe the interview results and is solely responsible for the accuracy of portraying comments made in the interviews.

displays nine of the ten characteristics R. Evered uses to describe strategic vice operational decisions. Evered says strategic decisions are: (1) comprehensive; (2) for, by or on behalf of top level management; (3) future-defining; (4) re-configuring the organization-environment relationship; (5) important; (6) non-routine; (7) value-setting; (8) new ventures and activities; (9) focused on environmental fluidity; and, (10) complex. (Evered, 1990, p. 1) The unit cost concept, if viewed as a strategy, seems to fit these characteristics.

The move to implementing unit cost resourcing can be compared to business strategy changes. In most cases, businesses change strategies in response to perceived environmental changes. In some cases, business strategy is designed with a fundamental homeostatic nature. As the environment changes, small changes occur in the firm so that the firm maintains balance with the environment. In adopting unit cost resourcing which the UNIT COST RESOURCING GUIDANCE states will maintain balance between costs and earnings, OSD leaders appear to be seeking a long term strategy that moves DoD business activities closer to the homeostatic mode.

The unit cost initiative embodies the largest change in DoD management since the introduction of PPBS, and arguably has more impact. The unit cost concept affects virtually 100-percent of the DoD budget and organizations, and will likely have a profound effect on DoD management. However, permanent, beneficial change will only arise as a result of changes in the culture and values of DoD managers. OSD leaders recognize the issue of "culture" by saying, "If we are to minimize the impact of constrained resource levels, we must change the environment and culture that exists at

many of our activities." (DoD Comptroller memorandum of 10 August 1989) To maximize the benefit of the new strategy, OSD leaders must concern themselves not only with what the changes will be, but how they will be made.

Robert B. Reich of the John F. Kennedy School of Government at Harvard suggests public servants accomplish change or implement policy using variations of three methods: (1) *effectiveness*, where the public official implements something in a manipulative manner because he thinks it is for the public good; (2) *responsiveness*, where the public official plays a passive role in doing whatever he is asked to do; and, (3) *deliberativeness*, where the public official establishes a broad base of relationships, understands that actions may have broad ramifications and seeks consensus oriented policies and actions, but also incorporates his own ideals into such policies or actions. (Reich, 1985, pp. 1-6) Expanding the Reich notion to management culture seems to indicate that the deliberative method would seem to best foster cultural changes. In the consensus oriented model, participants have a stake in the future, as opposed to the effectiveness method where participants carry out the plan of another person.

In implementing the unit cost concept, OSD formed various task forces composed of representatives from appropriate DoD components. However, these task forces were not formed to determine whether or not to adopt unit cost, but rather to establish implementation frameworks and definitions (e.g., what constitutes output within the different functional areas). It seems then, applying the Reich categories to the unit cost effort, that the OSD unit cost development and implementation could be classified as "effective." This approach should lead to development of the unit cost concept system,

but a "deliberative" approach would have enabled system development with an attendant change in culture.

The fully implemented unit cost concept integrates management skill with information technology, and provides a different (new) set of management incentives.<sup>15</sup> However, the unit cost system currently being implemented provides a high level of data aggregation. OSD leaders must carefully check that the system encourages the desired results. On this point, G. Anthony Gorry and Michael S. Morton write that "...systems which were developed for senior management had relatively little impact on the way in which managers made decisions. This...problem is a direct result of failure to understand the basic information needs of the different activities." (Gorry & Morton, 1971, pp. 55-56) OSD leaders want to change the way managers think by changing the systems managers use. The concept will only succeed if the system provides users with appropriate information to facilitate an evolution of the culture and values, and encourages goal congruence with that of the OSD leaders.

The remainder of this chapter examines Navy implementation of the unit cost system as a strategy, but focuses on the barriers to implementation, starting with a top level view. A more detailed discussion is framed within the context of Figure 3, "The Unit Cost Concept." This discussion analyzes implementation issues at lower levels and

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<sup>15</sup>The concept of the manager-information technology merger is presented in the DoD FINANCIAL OPERATIONS BUSINESS PLAN, of 8 August 1991. The Plan, is part of the OSD initiative on Corporate Information Management (CIM) and was produced by the CIM Financial Operations group. The Plan, provides a strategy for development and implementation of new financial operating systems.

reflects comments collected from field research. The chapter concludes by examining implementation of the unit cost system in several functional areas.

## **B. RESOURCE OR MICROMANGEMENT: THE TOP VIEW**

In an interview with the Honorable Robert J. McCormack, the Assistant Secretary of the Navy (Financial Management) (ASN(FM)), Mr. McCormack stated that he supported the unit cost concept. He felt the basic focus of unit cost, relating costs with outputs and increased cost awareness at all levels of management, is an important step in better allocating and using scarce DoD resources; he has publicly endorsed the unit cost initiative.<sup>16</sup> However, Mr. McCormack noted that the unit cost concept does not enjoy full support from all members of the Office of the Navy Comptroller (NAVCOMPT OP-82). Mr. McCormack explained the primary reason unit cost seems to meet resistance lies in the level and detail of data necessary to produce the unit cost information. Under the unit cost reporting system, lower levels of detailed accounting information become visible and important. With fixed budgets, detailed information tends to remain buried in the paper files of field level comptroller shops.

Mr. McCormack feels the primary objection to making data more visible is the increased exposure in the budgeting process as well as some loss of Navy control over the process. As the budget makes its way through the various reviews, additional details provided in unit cost data will give organizations outside the Navy (e.g., OSD, OMB and Congress) an opportunity to micromanage Navy affairs. He discussed his disagreement

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<sup>16</sup>Speech at the Naval Postgraduate School in April 1991.

with these concerns, expressing a more global perspective of resource allocation and an appreciation for the focus on the cost of output.

The notion that the Navy would lose control was confirmed and emphasized by a high ranking NAVCOMPT official. The official stated that the Navy is concerned that once the DBOF is established, OSD will arbitrarily move funds among the services without Navy consent.<sup>17</sup>

Another aspect regarding Navy support of the unit cost effort is that the Navy has provided little guidance to its headquarters or field level commands. The only formal memoranda addressing unit cost resourcing at the headquarters level was a ASN(FM) letter of 25 July 1991 which formally forwarded the detailed UNIT COST RESOURCING GUIDANCE provided as part of the 15 October 1990 Principal Deputy Comptroller letter. (McCormack, 1991, p.1) The first paragraph of the ASN(FM) letter states, "This program is currently in the execution phase for Supply Operations and Supply Depots." Yet the second paragraph states:

[the UNIT COST RESOURCING GUIDANCE] was previously provided *informally* to all Navy and Marine Corps members of the Unit Cost working groups and forms the basis for Supply Unit Cost Goals currently in existence. Since OSD(C)<sup>18</sup> advises that they intend to issue targets for the near future, enclosure (1) is provided for your information and action as necessary.<sup>19</sup> (italics added)

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<sup>17</sup>This allegation is probably correct. However, OSD routinely made intraservice stock and industrial fund transfers prior to establishing the DBOF.

<sup>18</sup>Office of the Secretary of Defense (Comptroller) office.

<sup>19</sup>Enclosure (1) to this letter was the UNIT COST RESOURCING GUIDANCE.

It is unclear what (if any) formal Navy direction the supply activities were following between October 1990 and July 1991, even though unit cost had been implemented in the supply area.

Discussions with several personnel in the NAVCOMPT office confirmed the beliefs of the ASN(FM) regarding the NAVCOMPT staff support of the unit cost concept. Some members of the NAVCOMPT staff believe that if the unit cost effort were not supported, it would "go away." Additional evidence that top level Navy financial leaders were not avid unit cost concept advocates was that unit cost received virtually no priority or resources within the NAVCOMPT office. As of August 1991, few personnel within the NAVCOMPT office were assigned responsibilities associated with implementing the unit cost concept in Navy functions.

For example, DMDC started programming the Navy portion of Base Operations Support allocation in the summer of 1991. To accomplish this, DMDC needed data on the structure of the Navy installations in order to determine host-tenant relationships.<sup>20</sup> DMDC received information on the many Navy installations and commands in "hard copy" or paper format. The Navy alleged it could not provide a timely response to the DMDC request for the information in a machine readable format. A review of the hard copy information confirmed it was nearly impossible to interpret and seemingly contradicted itself. DMDC was unable to obtain sufficient assistance from NAVCOMPT and had to turn to alternate means to accomplish their task.

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<sup>20</sup>A host is the command at a military installation responsible for providing landlord type services. A tenant is the receives landlord services.

The DoD Principal Deputy Comptroller formed a policy group of high level component officials. The group routinely meets with the Principal Deputy Comptroller. The purpose of the meetings is to facilitate communication between the components and OSD in implementing the unit cost concept. Group members raise component issues or problems which the DoD Principal Deputy Comptroller either resolves or communicates to the appropriate activity for review and resolution. The designated Navy representative is the Deputy Comptroller of the Navy.

On 9 August 1991, the DoD Principal Deputy Secretary issued a letter providing guidance to assist activities "which will be resourced through Unit Cost, in developing their FY 1992 Apportionment Review requirements." Shortly thereafter on 17 August 1991, the DoD Comptroller (Mr. Sean O'Keefe) issued a letter providing supplementary FY 1993 Defense Budget Guidance for the DBOF. Both of these documents required extensive budget displays in unit cost format for the execution of FY 1992 programs and the review of FY 1993 Budget Requests. These actions reinforce the objective that OSD intends to pursue unit cost as a resource allocation method, despite service and agency apprehension of the unit cost concept.

### **C. GENERAL IMPLEMENTATION ISSUES**

From the viewpoint of good management, it would be reasonable to expect DoD activity managers to embrace a system that promised to reduce cost, improve quality, provide a more equitable basis for personnel evaluations and provide better performance information for management decisions. However, the size and complexity of the DoD

establishment, the magnitude of the unit cost concept and the general resistance to change have created numerous obstacles. The rapid pace to implement the unit cost concept has been met with skepticism and OSD is concerned that defense organizations will not attempt to remove barriers to full implementation.

For clarity, the implementation discussion refers to the Unit Cost Concept figure previously discussed and repeated here as Figure 4. The figure is provided as framework for discussion of the implementation issues.

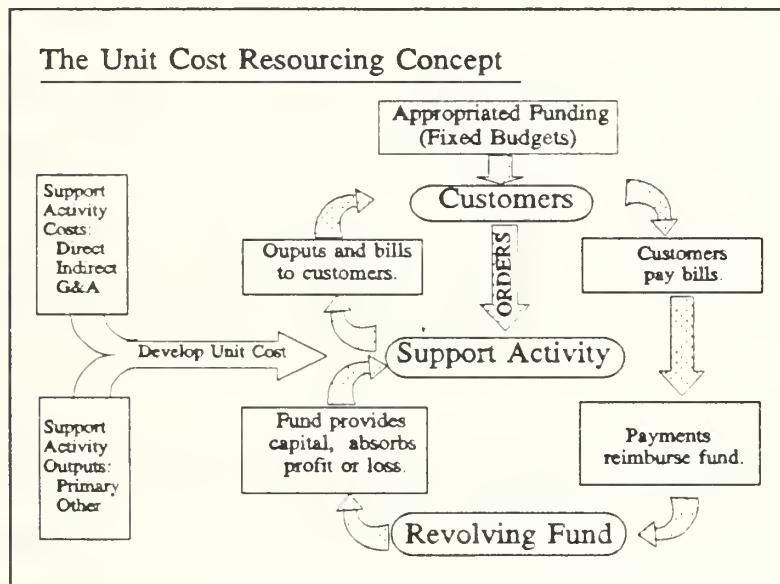


Figure 4

## 1. UNIFORM ACCOUNTING AND DATA RELIABILITY

In calculating the unit cost, DMDC requires an automated method of capturing total costs. (Refer to "Support Activity Costs" in Figure 4.) A key decision of unit cost implementation was to use existing financial information to minimize the time necessary to implement unit cost instead of developing a new, uniform DoD accounting

system. To meet this criteria, the Uniform Management Report (UMR) was chosen by OSD as the source for unit cost data. This source was chosen because DoD activities are required to report financial information via the UMR, making it a common system among DoD activities.

Only two of the seven field comptroller activities visited suggested their UMR data was accurate. Most stated they knew their UMR data was not accurate since there is generally little concern with UMR data. The majority of the field comptrollers interviewed indicated that making UMR data accurate is unnecessary since they do not use the UMR as a management tool and it would require resources they needed to employ elsewhere. Based on this reaction from the field comptrollers, it would appear that UMR data is not uniform and the reliability is questionable. Further, there has been no known OSD effort to validate the data. Therefore, if the cost accounting data underlying the unit cost goals is suspect, the unit cost goals may not accurately represent costs of business.

The OSD response is that DoD component accounting system data must include specified information. The data arrangement may differ from one system to another, but all the data needed for the unit cost concept is currently available. The unit cost system takes the available data and manipulates it to provide a unit cost. OSD considers the currently available data sufficient and accurate for unit cost computations.

None the less, the opening words of the UNIT COST RESOURCING GUIDANCE, say:

It is recognized that there is an absence of a uniform accounting system throughout the Department to capture unit cost data and this guidance is intended to establish a practical level of consistency and uniformity until such time as there is a standard system in place.

OSD is committed to developing and introducing a standardized DoD-wide accounting system consistent with the newly consolidated Defense Finance and Accounting Service (DFAS) and within the context of the Corporate Information Management initiative. However, development and introduction of such a system is not expected for several years.<sup>21</sup>

## **2. UNIT COST MEANS MORE WORK FOR COMPTROLLERS**

During the interview phase of this thesis, field level comptrollers expressed concern that the unit cost concept represents additional work load which will require additional staff. There are two issues driving this concern: (1) unit cost resourcing relies heavily on reimbursable orders and comptrollers perceive this will substantially increase the accounting and record keeping workload; (2) the DMDC unit cost report provides activity unit cost goals, earnings and cost accumulation at the component level. The DMDC unit cost reports should provide the activity commanders with useful information. However, comptrollers will have to locally develop and monitor a detailed unit cost reporting system in order to provide meaningful information to the lowest level of management within the activity.

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<sup>21</sup>The DoD Principal Deputy Comptroller indicated that he felt DOD would have a new standard accounting system within five years.

In addressing the first issue, OSD contends that this additive accounting work load can be overcome by placing large orders and encouraging frequent reports, but only requiring quarterly or infrequent billings. This planned action will reduce financial transactions and the reimbursement will be accomplished at the headquarters level, eliminating paper checks. The OSD(C) has indicated that in subsequent years technology may make manual intervention unnecessary. This assumption is based on the expectation that when the new standardized accounting systems are fully operational, field activities may not have to reconcile financial transactions.

Regarding the second issue, OSD personnel agreed that field comptrollers will have to devise local systems to provide appropriate unit cost information to the lowest level of management. However, OSD guidance indicates that this should not be solely a comptroller function. Line managers need to proactively participate in the development of a command unit cost information system to ensure all levels get the functional type and quality of information needed to promote greater effectiveness and management efficiency.

### **3. UNIT COST CALCULATION AND EARNINGS**

The unit cost calculation method treats all costs as variable, determining an average cost for the functional area. However, field comptrollers interviewed indicate they have fixed costs in the primary mission cost structure. Assuming component services and agencies accurately distribute unit cost goals among the activities of a functional area, the fixed cost portion of the activity cost structure precludes costs and earnings from staying in balance, as indicated in the UNIT COST RESOURCING

GUIDANCE. Activities operating under unit cost cannot influence demand (i.e., producers have no mechanism to legitimately increase requests for their output) and the activities may be able to exercise only limited control over significant costs such as labor. In addition, the unit cost rate is subject to significant variation based on the predicted demand level selected by OSD.

A DLA activity comptroller noted that when work load is increasing, unit cost can provide a favorable outcome for the support activity. An activity receiving operating funds under the unit cost system automatically receives more resources as demand for output increases. In the short run, fixed costs are not likely to increase. The fixed cost portion of the unit cost is recovered when the predicted demand is reached. As long as average variable costs do not increase with output, every sale made beyond the predicted output provides a substantial contribution to net earnings since the fixed costs have been covered.<sup>22</sup> The opposite result is achieved when the actual output is less than the predicted demand. In this case, unless managers have been able to reduce costs, a loss will result. This is largely a result of earnings not covering fixed costs. In the current environment, with downsizing of the force structure, it is realistic to predict a shrinking demand base until the force structure stabilizes. How this will impact the amount of unit cost earnings activities receive is unclear at this time since there are significant force structure decisions pending.

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<sup>22</sup>Net earnings is defined as Earning (Unit Cost times Output) less Total Costs.

#### **4. UNIT COSTS ARE NOT COMMERCIAL PRICES**

The objective of the unit cost concept is to "recover" all costs by relating them to an output. This approach is justified by the OSD(C) guidance which states that business must recover its costs through proper pricing. While it is true that commercial activities must recover costs through prices, the issue of commercial pricing is far more complex than the DoD unit cost approach of dividing accumulated costs by a work load base. (Refer to "Develop Unit Cost" in Figure 4.)

The comparison of DoD unit cost pricing to commercial prices implies that commercial activities would not accept offers for output if the offer did not cover the fully burdened cost of production. In fact, this is not true. Commercial activities frequently use a contribution margin approach to managerial accounting.<sup>23</sup> They are concerned with how much revenue a sale contributes over variable costs. This contribution helps cover fixed costs. Jobs orders are not rejected purely on the basis that the allocated fixed cost is not completely covered. Issues such as capacity utilization, market conditions, etc., influences price and job order acceptance.

#### **5. OUTPUT DEFINITION, EARNINGS AND INCENTIVES**

Another major concern was the issue of output definition. Most activities have many outputs. As currently implemented, the unit cost concept expresses all of the output for an activity in a single or few output numbers. Appendix B provides the output measures by functional area. (Refer to "Support Activity Output" in Figure 4.)

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<sup>23</sup>Contribution margin is "Equal to revenue (sales) minus all variable expenses." (Horngrin, 1987, p. 952)

Field comptrollers contend unit cost output considerations do not adequately describe the work of an activity in a manner useful to managers at all levels. Further, many costs which may be captured to get total cost could have cost drivers unrelated to the primary output. For example, an ICP earns a percent of every dollar of stock funded material sold. This occurs regardless of whether the ICP sells one million one dollar parts or one, one million dollar part. It is possible that the activity incurs much higher costs in the former case than in the later. Under the unit cost concept, both cases earn the same amount of operating resource.

An interesting factual example of output cost versus unit cost earnings was found at the Defense Depot Region, West (DDRW). During the Desert Storm/Shield operation, DDRW received a single requisition for pre-packaged food rations known as MREs (Meals, Ready to Eat). The output, "issue per line," earns DDRW about \$28.50 per line item issued. DDRW filled a single requisition for a quantity of MREs that equated to twenty-eight train box cars of the MREs, for which DDRW received the unit cost earning of \$28.50. While this is a rare occurrence, it serves to illustrate the point that work load costs are unrelated to earnings.

During a recent interview, Mr. Shycoff acknowledged such problems. He stated that as unit cost is implemented and experience is gained, he hoped the users in the functional areas will determine additional measurable outputs that will provide better managerial information. Mr. Shycoff indicated his willingness to ensure the unit cost system is flexible. As an example, Mr. Shycoff said that for supply depots, he foresees that the unit cost system of the future will relate a unit cost down to the National Stock

Number (NSN) level. This change would account for the variations of cost incurred in handling and storing the diverse materials DoD requires. Examples include specialized handling techniques such those needed for hazardous material or for variations in size and weight (e.g., paper clips versus ship anchors). At the depots, the system currently measures line items issued and received without regard to type of material.

## **6. OUTPUT: INCENTIVES AND QUALITY**

Another issue related to output definition is that of management incentives and quality. Unit cost earnings only accrue for output actually purchased. This feature is designed as a management incentive to provide output more efficiently, only at the level demanded. However, an unintentional but unavoidable result of the unit cost concept is that managers who need earnings to cover costs now have an incentive to "game" output measures to produce higher earnings. Two examples illustrate this point:

a. In the interview with Mr. Shycoff, he indicated that originally DLA had been assigned four unit cost numbers: issues and receipts for each binalbe (small items) and bulk (large items). Bulk items received a unit cost about twice that of the bin items, and the unit cost earnings was determined by the storage location items were assigned to or retrieved from. Each location was designated as either bin or bulk. One activity realized that by reporting more of their receipts and issues from the bulk locations they would receive more earnings. When Mr. Shycoff learned this, he directed that the unit cost numbers be revised to reflect only issues and receipts, regardless of the item.

b. A training command receives earnings based on the output of number of graduates. It is possible that a command in need of resources could lower its standards, produce more graduates and generate more earnings.

Although the UNIT COST RESOURCE GUIDANCE stipulates that lower cost is not to come at the expense of quality, in many cases quality is difficult to measure. For example, what is the quality difference between a training graduate who passes the course by a point and a person who fails by the same margin. Unit cost could provide incentives that tend to lower quality of output in ways that would be difficult to detect in the short run, but that could have adverse long run ramifications.<sup>24</sup> For example, if ICPs lower spare stock quantities to reduce costs, the lower inventory levels could impair or reduce operational force readiness and capability by increasing equipment downtime for lack of parts.

One way to mitigate the potential impact of quality reduction and encourage managers to find other ways to cut costs is by giving consumers choices. If consumers perceive "quality" is declining, given choice they might choose to purchase output from a different producer. Knowing his demand base could erode because of poor output quality would encourage producers to maintain a focus on the cost and "quality" factors of their output.

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<sup>24</sup>Quality is defined in many ways. These include the physical "quality" of products sold to the "quality" of services which might be based on through-put or waiting time.

## 7. PROFITS, LOSSES, GAIN SHARING AND TQL/M

Unit cost activities are targeted to operate at a net operating result (NOR) of zero, i.e., the breakeven point. But, because, the unit cost method of resource allocation ties operating resources to output, "profits" or "losses" will likely result. (Refer to "Customers Pay Bills" and "Payments Reimburse Fund" in Figure 4.) Those activities with losses will have the loss built into the unit cost rate for the next year in order to reimburse the revolving fund for the "capital advance" required to cover losses. Those activities with profits may have unit cost goal lowered for the next year reflecting their better than expected productivity. However, because the unit cost rate is a composite for the functional area within a component, whether or not improved productivity will actually reduce rates is a function of how well the component has distributed the unit cost goal. A paradox seems to emerge. If managers improve the production process at one activity, the reward is a lower per unit earnings for the following year. Another activity in the same business that has not similarly lowered costs is rewarded for failure to lower costs by receiving higher per unit earnings. This situation would seem to provide a disincentive to the first activity to continue lowering costs.

To counter this apparent problem, as with the issue of quality previously discussed, if consumers had choice, then the producer that lowered his cost the most could expect increased demand as a result of a lower price (assuming demand is price sensitive). Allowing consumers choice could offset the disincentives the unit cost structure may introduce.

Activities with profits may share profits under the authority of DoD instruction 5010.31-G, the DoD guide for gain sharing programs. During the interview with Mr. Shycoff, he stated that the profit sharing potential was the unit cost concept connection with the total quality leadership/management (TQL/M) concept, the current focus for DoD quality management improvement. This is so because as employees and management work together to improve process management and reduce costs, the profit sharing potential acts as an incentive reward. The TQL/M purist takes issue with this approach because in the TQL/M philosophy, the "reward" is more intrinsic, stemming from each employee being a participant in management and its evolution. "Providing" a new management system and forming task forces to implement it is not an application of TQL/M. In regard to the actual payout, field research found that profit sharing at supply depots operating under unit cost or similar systems only provided substantial payouts for the first year (over \$500 per employee). By the third year, payouts had all stopped or were relatively insignificant (less than \$100 per employee).

## **8. CONSTRAINTS, CHOICE AND INTERDEPENDENCE**

OSD contends that activities cannot efficiently implement unit costing when headquarters burdens field activities with constraints. Among the most severe of these is labor constraints. For example, NAVSUP operates under two seemingly mutually exclusive systems that ostensibly control costs by controlling the ability of a field activity to hire labor. These systems are called manage-to-payroll (MTP) and end strength ceilings. Under MTP, an activity is issued a labor budget, which in theory may be used to hire any combination of workers (different pay levels). In reality, such hiring is

limited by the senior (headquarters) management imposing labor limits in the form of end-strength (numbers of people) ceilings. Mr. Shycoff claims activities cannot efficiently implement unit cost with such limits on local managers.

There are other constraints that also impede the ability of an organization to pursue improved productivity. Examples include mandatory periodic OMB Circular A-76 reviews, legislative or agency imposed procurement regulations, and restrictions on the ability of managers to choose the most cost effective means of obtaining support. OSD leaders seek to relieve as many of these internal and external constraints as reasonably feasible to provide managers greater flexibility in pursuing improved efficiency and effectiveness.

This is not to say activity managers should be allowed unlimited choice. Common sense must be exercised to ensure managers do not choose options that benefit one organization at the expense of overall efficiency or cost effectiveness. An example, makes this point clear: A commanding officer of a commissary found that fire protection service could be obtained less expensively than the cost of the on-base fire station allocated to the commissary. The commanding officer was allowed to purchase the alternate fire protection. What is not clear is whether the fire station was able to reduce costs by an amount equal to the charge (allocation) to the commissary. It is highly unlikely this occurred. Decisions that benefit one activity should not be made without considering the systemic ramifications and organizational interdependencies.

## **D. UNIT COST IMPLEMENTATION IN NAVY FUNCTIONS**

For most Navy managers, the concept of resource management by a unit cost system is new. Most of the field comptroller personnel interviewed had heard of the unit cost concept. However, only about one-half of those interviewed had read the UNIT COST RESOURCING GUIDANCE or any memoranda on unit costing. At the field level, there is a general confusion about the concept and its goals, and no formal Navy training available to correct this situation. Thus, there is apprehension about the potential usefulness of the unit cost system. So far, the main contact most field activities have had with unit cost has been with data collection evolutions conducted during late November 1990. (NAVCOMPT, 220454Z Nov 90)

Although the Navy has not formally incorporated unit cost information into a training program, one Navy activity recently acquired an Army-produced training video tape. The tape was being introduced into the training program of the activity. The tape, entitled "Cost Per Output," features an interview with Mrs. Mary H. Smith, Deputy Director, Program Analysis and Evaluation for Program Management Systems for the U.S. Army. The tape was produced by the U.S. Army Logistics Management College and is an excellent primer for understanding the unit cost concept at any level.

### **1. SUPPLY DEPOTS AND INVENTORY CONTROL POINTS**

The Navy supply system, overseen by the Commander, Naval Supply Systems Command (NAVSUP) is responsible for worldwide logistics and supply operations supporting the U.S. Navy. This is accomplished mainly through supply operations and depots. Supply operations (inventory control points, or ICPs) provide fleet support,

including inventory management, spare part allowance list maintenance and direct fleet support. Supply depots (called Naval Supply Centers, or NSCs) provide physical distribution service, including receipt, storage and issue functions. They also provide direct fleet support functions, such as technical research and spot procurement for high priority requirements. Tables 2 and 3 display business information for Navy ICPs and depots respectively, for FYs 90 and 91, and is provided to indicate the magnitude of ICPs and depot operations and provide unit cost information. The data Tables 2 and 3 is taken from DMDC-produced unit cost reports.

Since 1986, NAVSUP has been operating two ICPs and eight major depots on a resource allocation system called Productive Unit Resourcing (PUR). In essence, PUR is a type of unit costing. As such, NAVSUP has chosen to retain the name PUR rather than adopt the name unit cost. There are several important differences between the unit cost rate and the PUR rate. These include: the costs included in the calculations of the rates, the method of accepting the rates and the outputs to which the rates apply.

The unit cost goal is fully burdened with the costs of operations and material obligations.<sup>25</sup> PUR captured only variable or "controllable" operating costs. Under PUR, material obligations and other costs were budgeted separately. Another difference between unit cost and PUR concerns the process for setting goals. Under the unit cost system, OSD will provide DMDC-calculated unit cost goals and these are subject to change over the fiscal year. With PUR, the activity comptrollers individually calculate

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<sup>25</sup>Material obligations are the actual costs of material paid to material suppliers.

their PUR rates and travel to NAVSUP headquarters to negotiate the final rate. The last major difference is that PUR recognizes many outputs while unit cost provides one goal for the ICPs (dollars of sales) and two goals for the depots, (line item issues and receipts).

TABLE 2

	\$ In Millions (Except Unit Cost)	
	<u>FY 1990</u>	<u>FY 1991</u>
<u><b>Inventory Control Points (Total):</b></u>		
<u><b>Primary Output Costs<sup>1</sup></b></u>		
Civilian Labor	\$ 109.9	\$ 157.7
Military Labor	5.8	10.9
Depot Reimbursement	97.5	227.1
Material	3,031.4	3,007.5
Other Non-Labor	4.8	269.4
Allocated Costs	<u>93.3</u>	<u>109.7</u>
Total Costs <sup>2</sup>	<u>\$ 3,342.7</u>	<u>\$ 3,783.2</u>
Work load (Dollars of Stock Fund Sales)	<u>\$ 4,181.9</u>	<u>\$ 4,656.6</u>
Unit Cost	<u>\$ .80</u>	<u>\$ .80</u>
<u>Total Other Output Costs</u>	<u>\$ 26.8</u>	<u>\$ 19.7</u>
<u>Total ICP Output Costs</u>	<u>\$ 3,369.5</u>	<u>\$ 3,802.9</u>

<sup>1</sup>Early unit cost reports classified some cost differently than more recent reports, making some comparisons difficult between years.

<sup>2</sup>Differences due to rounding.

TABLE 3

	\$ In Millions	
	FY 1990	FY 1991
<b>Navy Supply Centers (Total):</b>		
<u>Primary Output Costs: Receipts</u>		
Civilian Labor	\$ 20.5	\$ 26.3
Military Labor	5.1	2.6
Non-Labor	1.7	3.2
Allocated Costs	<u>28.2</u>	<u>26.7</u>
Total Costs <sup>1</sup>	<u>\$ 55.6</u>	<u>\$ 58.7</u>
Work load (In Total Lines Received)	2,756,386	2,224,441
Unit Cost	<u>\$ 20.17</u>	<u>\$ 26.41</u>
<u>Primary Output Costs: Issues</u>		
Civilian Labor	\$ 36.5	\$ 46.6
Military Labor	7.2	4.5
Non-Labor	298.9 <sup>4</sup>	14.4
Allocated Costs	<u>65.1</u>	<u>47.2</u>
Total Costs	<u>\$ 407.7</u>	<u>\$ 112.7</u>
Work load (In Total Lines Issued)	7,759,257	6,860,298
Unit Cost	<u>\$ 52.55</u>	<u>\$ 16.42</u>
<u>Primary Output Costs: Other Costs</u>		
2nd Destination Transportation <sup>2</sup>	\$ NOTE <sup>4</sup>	\$ 173.6
Shipping/Local <sup>3</sup>	29.4	31.6
Central Design Agency	NOTE <sup>4</sup>	<u>35.7</u>
Total Other Costs	\$ 29.4	\$ 240.9
<u>Total Primary Output Costs</u>	<u>\$ 492.7</u>	<u>\$ 412.3</u>
<u>Total Other Output Costs</u>	<u>\$ 159.1</u>	<u>\$ 387.9</u>
<u>Total Navy Supply Center Output Costs</u>	<u>\$ 695.1</u>	<u>\$ 800.2</u>

<sup>1</sup>"Totals" differences due to rounding.

<sup>2</sup>Contract carriers.

<sup>3</sup>Includes Civilian and Military Labor, and Allocated Costs.

<sup>4</sup>"Other Costs included in "Primary Non-Labor" could not be broken out.

Data Source for Tables 2 & 3:

FY 1990 Depot Cost and Manpower Analysis Report of 1/12/91

FY 1991 Cost Per Output Reporting System Total Navy Supply of 11/5/91

During interviews it was clear that NAVSUP headquarters personnel were well informed and generally supported the unit cost concept. The NAVSUP comptroller stated he saw PUR as a subset of unit cost and that PUR would eventually transition into the larger unit cost concept. However, as previously discussed, there were reservations expressed about the reliability of the unit cost goals since they are based on data from the UMR and include material cost as part of the unit cost.

It is interesting to note that even though the Principal Deputy Comptroller letter of October 15, 1990 announced that unit cost was working at supply depots, the pre-unit cost version of PUR was actually in place at Navy depots and operating with the Navy stock fund in FY 1991. In order to meet the timetable, DMDC was producing the monthly unit cost reports so that earnings and costs could be tracked as if unit cost resourcing were actually working. An OSD analyst explained this apparent paradox by saying OSD can claim unit cost is working because with DMDC producing reports and collecting data, "it is working." OSD has allowed activities to slowly achieve operating status in recognition of the complexity in shifting to unit cost resourcing. However, the analyst indicated that OSD personnel would be working with the components to encourage a more rapid implementation of the unit cost concept into designated functions.

*a. Current Status*

With a history of operating under PUR, NAVSUP activities should generally experience a smooth transition to unit cost resourcing. However, as of August

1991, NAVSUP had provided little specific direction to field activities with regard to unit cost or review of unit cost reports. Further, NAVSUP has advised field activities that the transition to unit cost will be transparent. The DMDC-produced unit cost reports were provided to NAVSUP field activities at the insistence of OSD personnel. This information was confirmed by the headquarters and field activity interviews.

Unit cost resources are provided to depots for receipts and issues and to ICPs as a percentage of material sales. Additionally, ICPs must pay depots \$25.00 for each line of material issued or received, since OSD has taken the view that the depots "do the ICPs" work. OSD established this relationship on the basis that the ICPs are responsible for the how much, where, what and when in inventory management while the depots are responsible for the actual inventory handling. NAVSUP assigned a split of 48 and 52 percent respectively between the two ICPs, Navy Ships Parts Control Center in Mechanicsburg, PA (SPCC) and the Aviation Support Office in Philadelphia for line items of material handled at the depots. OSD has requested NAVSUP provide a means to measure actual work load between the two ICPs.

With regard to report and information flow, DMDC currently generates monthly Unit Cost Reports and sends them to NAVSUP in Washington, D.C. via the OSD Comptroller office. NAVSUP reviews the reports and transmits them to the field activities. Once at the field activities, there is no formal guidance as to what actions to take.

Three NAVSUP field activities were visited and each handled the unit cost reports differently. At one, the comptroller resource management personnel

carefully reviewed the reports and reconciled them against their local records. They advised NAVSUP and DMDC of the differences found. This command was concerned with understanding and materially participating in unit cost resourcing. They expressed their convictions that the unit cost resourcing will dramatically impact their future resourcing. Also, this command was one of only two commands who stated their UMR was accurate and that they use the UMR as a management tool.

At another NAVSUP field activity, the comptroller claimed to never have seen the unit cost reports. After searching, a unit cost file was found. The current unit cost report, bearing the comptroller's initials, had been filed in the folder. At this command, the only action taken with the report was a review and filing. No further action was taken with the unit cost reports and it is not clear what purpose the review served. In addition, the command reported they spent the minimum time preparing UMR data and that they suspect it is inaccurate. At this command, the comptroller said the UMR is submitted to fulfill a reporting requirement. The command has implemented a sophisticated, locally designed management information system to manage costs. No interfaces with external systems exists.

The third NAVSUP field activity visited was somewhere between the two described above, with regard to unit cost. The comptroller reviewed the monthly unit cost reports, had them neatly filed and knew where they were. However, no action was taken on them since there are no requirements associated with the reports. The purpose in reviewing the reports was to be able to respond to NAVSUP questions should they arise. The comptroller was well informed on the unit cost issue. Also, this activity was

the only other activity that claimed its UMR data was accurate and used the UMR as a management tool.

*b. The Future*

NAVSUP is committed to fully implementing the new unit cost concept according to NAVSUP personnel. NAVSUP officials indicated the PUR label would remain at NAVSUP activities. As a practical matter, unit cost will remain a major concern with NAVSUP. However, as a result of implementing DMRD 902, an OSD initiative to consolidate physical distribution responsibilities under DLA cognizance, Navy depots will transfer these responsibilities to DLA by FY 1993. Consequently the NSCs will cost substantially less to operate and should become simpler to manage. No significant changes are expected at ICPs.

There is one significant concern highlighted by the Table 3 data. "Total Other Output" costs represent about 48 percent of the total NSC costs. OSD and NAVSUP have attempted to determine how to classify the "Other Outputs" such that the output is measurable and therefore suitable to have a unit cost rate calculated. This is of concern because of the magnitude of the costs. Until this is accomplished, OSD has agreed to fund these costs as a fixed type budget financed from the revolving fund, but recovered as part of the price charged to customers. This situation also exists at the ICPs, but to a much smaller extent.

## 2. MEDICINE

The Bureau of Medicine and Surgery, (BUMED), is responsible for overseeing the Navy health care system. Among other responsibilities, this task includes providing administrative and technical oversight of the Navy medical treatment facilities (MTF), supporting centralized medical equipment procurement, providing health care guidance and standards and overseeing the Navy portion of Civilian Health and Medical Programs of the Uniformed Services (CHAMPUS) system.

Since the late 1970s, the DoD health care services, in conjunction with the office of the Assistant Secretary of Defense (Health Affairs) (ASD(HA)), have developed a series of standard information systems to support medical operations. However, none of the systems were designed to make resource allocations. Instead, health care historically has been direct funded by traditional fixed budgets. In their paper discussing patient level accounting, R. Kopberman and W. Fisch describe some of the DoD medical information systems: (adapted from Kopberman and Fisch, 1991, pp. 1-2)

Defense Enrollment Eligibility Reporting System (DEERS)-DEERS provides a single source for determining benefit eligibility.

Composite Health Care System (CHCS)- CHCS is currently at several test sites. The purpose of this system is to provide an integrated automated system which will support many of the information requirements of both health care providers and administrators. It collects data as the patient goes through the MTF, from physicians, the pharmacy, lab tests etc. There is currently no interface between CHCS and a cost and accounting system within DoD.

Medical Expense and Performance Reporting System (MEPRS)-MEPRS allows the comparison of workload, expense data, and manpower utilization by workcenters. It distributes expenses through a step down process resulting in an expense per performance factor which may be converted into a medical work unit. The pharmacy, radiology, and pathology workcenters have some automated work load

capture capability which results in weighted values. MEPRS is being enhanced with a new Expense Assignment System (EAS III) which will be able to track expense elements before step down [allocation].

Automated Quality of Care Evaluation Support System (AQCESS)- AQCESS was developed to report clinical, administrative, and managerial information to support inpatient administration of DoD medical quality assurance programs. The functional capabilities currently provided by AQCESS are available at all MTFs - except at CHCS test sites where a new module has replaced regular AQCESS. It contains an automated admission and disposition record per inpatient which includes patient episodes, diagnosis and procedure.

Table 4 displays Navy health care operations data for FY 90 and 91 to provide a magnitude of operations. No official unit cost data is available for the medical area.

TABLE 4

	\$ In Millions	
	FY 1990	FY 1991
<b><u>Hospital and Clinic Costs (Total)</u></b>		
Cost of Operations	\$ 2,379.5	\$ 2,742.9
Number of Hospital Admissions	199,746	191,137
Number of Out-Patients Visits	10,728,970	11,074,559
<b><u>CHAMPUS (Total)</u></b>		
Cost of Operations	\$ 993.1	\$ 1,201.7
Number of Patients Served	492,269	550,00 <sup>1</sup>

<sup>1</sup>Estimate, data for FY 1991 was not available.

Data source (except for CHAMPUS FY 1991): BUMED Code 14.

*a. Current Status*

As with the other business area, the introduction of unit cost resourcing will change medical care funding. A precondition to incorporating a business area into

unit cost is to define the output. A measure called the Medical Work Unit (MWU) has been selected as the health care unit of output. The MWU is a composite number that represents inpatient and outpatient work loads. The inpatient work loads, called Inpatient Work Units (IPU), measures admission and dispositions and is adjusted using a DoD Relative Case Mix Index. Outpatient work load, called Ambulatory Work Units (AMU) is based on clinic visits and adjusted by a weight assigned specifically to each clinic. DMDC calculates the MWU which takes data from the MEPRS. CHAMPUS costs are not included in the MWU definition.

Currently, unit cost resourcing has not yet been implemented for DoD health care but OSD is expected to include the function in FY 1993. In discussions with representatives of BUMED, it appears that the Navy health care providers are concerned that using the DMDC-calculated unit cost goal would provide meaningless information since case mix and work load vary greatly by medical facility. Use of the single unit cost goal would not properly reimburse activities for their costs. OSD guidance indicates that this is exactly why the services, and not OSD, are tasked with properly distributing the unit cost goals among the functional area activities.

Additionally, a BUMED representative indicated that, like the UMR, MEPRS data is inconsistent and it may be reliable at only about half of the BUMED commands. Again, if the underlying data is not accurate, then the unit cost information is suspect. However, since unit cost will not be applicable to the health care function until FY 1993, activity comptrollers could revise reporting procedure to "clean up" their UMR and MERPS to ensure overall accuracy.

From the BUMED perspective, the current status of unit cost is depicted in a 2 July 1991 letter from BUMED to the DoD Comptroller. The letter provided the BUMED evaluation on the first DMDC unit cost report for the medical area. The letter stated:

The data contained in enclosure (1) [the unit cost report] could not be meaningfully interpreted by my analysts as the methodology used in generating the report could not be ascertained. If the methodology used in generating this report were known, then data could be interpreted and more worthwhile recommendations could be made.

Three BUMED personnel indicated that the health care area should not be subject to unit cost resourcing. Instead, if DoD is to become more businesslike in this area, a system similar to patient level accounting used in the private sector should be implemented. Even if this were done, the BUMED representatives indicated CHAMPUS should be excluded since CHAMPUS benefit payout is a function of claims submitted, not management cost control.

Several OSD and DMDC personnel interviewed commented that they believed the medical community expects that if the medical community does not support unit cost resourcing for the health care function, it will not be implemented. Indications are that unit cost resourcing for medical care will be implemented despite the lack of the medical community support. However, when finally implemented, some have suggested it is likely that unit cost resourcing may appear more like the private sector patient level accounting systems.

*b. The Future*

In addition to planning to move medical care costs into a revolving fund and unit cost resourcing based on the MWU, OSD has worked on other initiatives for health care. (OSD Paper, undated, pp. 1-3) These include:

CHAMPUS Work Unit (CHWU) - At the time that the unit cost group determined that MWUs would be the output for MTFs, they also decided to develop a CHWU. MWU and CHWU would be additive for comparison purposes, i.e. how much does it cost us to provide care within the MTF compared to the overall cost of providing that care under CHAMPUS. The unit cost group is only in the beginning stages of CHWU development.

Establishing a Patient Level Accounting System - The primary short term purpose of this effort is to develop some method of aggregating costs per patient within an MTF so that the MTF can create a patient bill. Then the cost of care in the MTF can be compared with the cost in the Catchment area under CHAMPUS.<sup>26</sup> This will also assist DoD in making claims to insurers for payment under third party collections.

The long term objective of the OSD initiative is to implement detailed patient level accounting in a standardized DoD-wide format. The general systems that would need to be developed or modified to support improved management of DoD Health care, including patient level accounting, are: a single DoD accounting and finance

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<sup>26</sup>A "Catchment Area" is the geographic region for which a CHAMPUS administrator is assigned responsibility.

system; a DoD-wide enrollment system for health care beneficiaries; and, timely, accurate CHAMPUS data at a very specific level of detail.

Recently, there has been increased pressure on the component services to make decisions on whether to treat patients within the MTF or send them out on CHAMPUS. As the cost of private sector health care becomes increasingly expensive, and since DoD already owns and maintains hundreds of MTFs, this "make or buy" decision is becoming more critical to controlling overall DoD health care costs. ASD(HA), realizing that this was becoming an issue, awarded a contract in March 1991 to evaluate all current systems within Health Affairs and determine what might be done regarding the development of systems for patient level accounting. Koppelman and Fisch say that the existing systems:

... support numerous medical functions, pharmacy, patient appointing and scheduling, laboratories, etc., [but] there is no one system that has been designed for or can be used effectively, in its current configuration, to achieve patient level accounting.

The overall objective for the OSD health care initiatives is to ensure that everything fits together and creates a comprehensive approach to using health care financial and management systems. For instance, development of a patient level accounting system should not be segregated from development of an overall measure of output for the MTF.

Unit cost implementation in the medical area will be an initial step towards a patient level system. The future system will likely be able to produce patient specific bills and also provide aggregated data useful to managing MTFs and the health

care system, including CHAMPS. Whatever ultimately happens, the medical community should be preparing to implement and manage under the unit cost concept in FY 1993.

### 3. RECRUITING

The unit cost concept will clearly provide new and potentially important information to focus management attention on costs. The object is to provide information that will enable managers to align output production with demand. This is especially true for traditional business areas like supply operations. However, unit cost is also being implemented in other functions not traditionally considered comparable to business. One non-traditional business function in which the unit cost concept is being implemented is military personnel recruiting. Table 5 provides an aggregate overview of total FY 1990 expenditures for the Navy Recruiting Command.

The Navy Chief of Personnel Office (BUPERS) is the major claimant for the Navy Recruiting Command. BUPERS comptroller personnel (Code 02) have worked at developing a unit cost system based on guidance from OSD. Recruitment contracts were used as the unit of output. Contracts were made in six recruiting areas across the country. The unit cost goal was calculated using the cost data and contract numbers.

The Code 02 personnel indicated that currently, without the aid of unit cost information, recruiting area costs are examined. The interviews indicate that BUPERS personnel believe the unit cost data would be of little use to the Recruiting Command, especially at the lower management levels. Individual recruiting offices generally have small staffs and little flexibility over their costs.

The total cost for the Navy recruiting effort in FY 1990 was about \$344.7 million excluding base operations support allocations but including the cost of military personnel.<sup>27</sup> Labor (civilian and military) and advertising constitute over 81 percent of the total recruiting budget. In addition, Navy recruiting stations frequently rent office space together with other services. Compared to the supply and medical functions, the

TABLE 5

<b>TOTAL NAVY RECRUITING COMMAND COSTS FOR FY 1990</b> (Data provided by Chief of Personnel, Code 02)		
<b>Category of Cost</b>	<b>Amount (\$ in Millions)</b>	<b>Percent of Total</b>
Civilian Pay	17.0	4.93
Travel and Transport	28.5	8.27
Rents and Related Costs	14.9	4.32
Printing	.9	0.26
Supplies and Materials	6.0	1.74
Equip Purch and Maint	4.3	1.25
Other Purchased Services	10.3	2.99
Advertising	25.1	7.28
Military Personnel Costs	237.7	68.96
<b>TOTAL</b>	<b>344.70</b>	<b>100.00</b>

recruiting total of \$344.7 million is relatively small. As the force structure is downsized, this will likely mean fewer personnel will be recruited.<sup>28</sup> Given the nature of recruiting

<sup>27</sup>A small amount of reimbursable funding was not included in the Table 5 totals.

<sup>28</sup>This is true for the active forces, however, the impact on reserve forces is unclear.

costs, the magnitude of the recruiting budget, and current force structure downsizing efforts, it is unclear how managers will benefit from the unit cost concept in this function.

## **E. IMPLEMENTATION SUMMARY**

This chapter has discussed implementing the unit cost concept from a variety of perspectives. The chapter discussed unit cost as a strategy, and progressed to providing top Navy leadership views, field comptroller issues and finally addressed implementation in several specific functional areas.

The objective of this chapter was to provide a broad overview of how unit cost is interpreted by the potential users at many levels. The discussion in this chapter has focused on problems in implementing the unit cost concept. This does not mean that the unit cost concept is a bad idea. It should not be surprising to find resistance to and potential problems with implementing a new system into an organization the size of DoD. Unit cost resourcing represents a dramatic new management tool, which, when employed properly, should provide unique and important information to all levels of management.

This chapter suggests that despite the many achievements to date, much work remains in all the areas that the unit cost concept will be implemented. Additionally, the chapter serves to highlight areas requiring attention from both unit cost developers and users. The chapter also discussed resistance to the unit cost concept. It is understandable why managers comfortable with one system are unwilling to accept a new

system. It appears likely that the unit cost concept will be fully implemented at the component level as OSD leaders have planned. Managers who continue to resist the unit cost concept are not working to properly implement or improve the concept and thereby will fail to make unit cost resourcing an asset for their operations. OSD leaders have made important strides in attempting to posture DoD to successfully meet future challenges. However, success, will come not as a result of brilliant leadership or ideas alone. Success under the unit cost concept requires cultural changes and adoption of the "new" values at every level of management and by each employee. This then, is the real challenge to unit cost implementation within the Department of Defense.

## **V. UNIT COST: A MICROECONOMIC ANALYSIS**

This chapter analyzes the unit cost system objectives within a microeconomic framework. The analysis is accomplished by applying basic microeconomic concepts to the unit cost objectives. The analysis does not employ econometrics to prove conclusions.

A potential limitation of an economic analysis is that the unit cost rate is a composite rate for all activities in a support area. The economic review analyzes the unit cost system as though each particular activity has its own unit cost goal. The analysis is relevant because a unit cost can be developed on an activity by activity basis. OSD guidance states this should be the goal of each DoD component.

### **A. OBJECTIVES OF AN ECONOMIC ANALYSIS**

OSD is attempting to structure DoD support activities to be more businesslike by establishing producer-consumer relationships between support and line activities. Microeconomics provides an appropriate analytical framework to examine unit cost resourcing since microeconomics models such relationships. The analysis is also relevant because unit cost resourcing effectively establishes markets for defense-produced goods and, to some degree, OSD seeks to compete in-house produced output with privately produced output.

More fundamentally, unit cost resourcing is an OSD initiative to improve the efficient use and allocation of scarce DoD resources. Underscoring the validity of an economic analysis of unit cost resourcing as a resource allocation system, Edwin Mansfield writes, "...economics is concerned with the way in which resources are allocated among alternative uses to satisfy human wants." (Mansfield, 1988, p. 1)

Microeconomics does not provide the "right" answer. Rather, its value is as an analytical tool within which decision makers model and predict outcomes of alternative policies. Based on the predicted outcomes, decision makers then choose which policy provides the most "right" outcome.

## B. UNIT COST ESTABLISHES MARKET CONDITIONS

Economists study markets and the behaviors that shape markets. Unit cost resourcing establishes market conditions by virtue of the inherent producer-consumer relationships. Consumers choose behaviors that maximize their welfare while producers act to maximize their profits.<sup>29</sup> Also, producers function under administrative or legal constraints that presumably provide strong incentives to finish the fiscal year in the "black." Figure 5 represents possible market structures and gives an example of an industry that reflects the characteristics of each market type. The universe of markets is represented by a triangle; each corner represents the pure form of that market. The bounds of the Figure 5 universe of markets are perfect competition, monopolies and

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<sup>29</sup>Under unit cost, OSD intends production operations to breakeven. However, the profit motive exists because profit or loss are inevitable and gain sharing programs are allowed under DoD instruction 5010.31-G.

oligopolies (or duopolies). Actual market structures usually contain some of each of the pure market elements. Real activities will fall inside the triangle and, depending on the specific industry, will tend to be associated with one of the corners. (Lancaster, 1973, pg. 199)

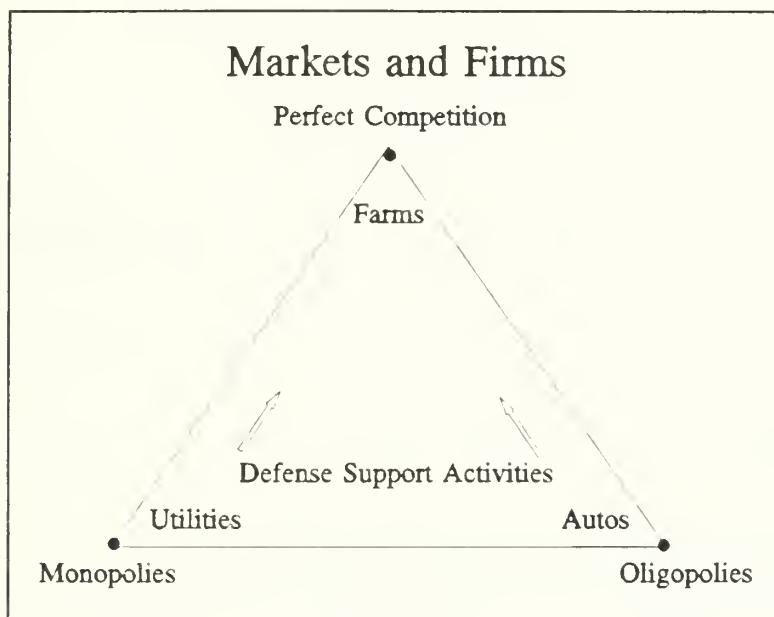


Figure 5

Figure 5 also depicts defense support activities' position and the movement expected as a result of implementing unit cost resourcing. Initially, defense support activities are assumed to exist in the lower part of the triangle because few activities produce the same output and may exhibit monopolistic or oligopolistic tendencies. However, as defense producers compete with each other and with private producers for scarce resourcing, market forces are assumed to cause defense support activities to behave more like competitive firms, that is become profit maximizing.

## C. FRAMEWORK OF THE ANALYSIS

The unit cost concept will be analyzed by applying microeconomic principles to some of the unit cost objectives discussed earlier in Chapter III, thus establishing a framework for the analysis. The objectives have been reworded but retain the original intention. The unit cost objectives to be considered are:

- (1) To encourage producers to become more efficient;
- (2) To encourage consumer restraint by purchasing only what they need;
- (3) To encourage producers to improve decision making and provide a means to better evaluate the performance of managers and organizations.

The remainder of this chapter will analyze the objectives stated above, but before doing so, some economic concepts and their connection with unit cost will be discussed.

## D. ECONOMIC CONCEPTS AND ASSUMPTIONS

This section addresses the economic concepts and assumptions used in analyzing the unit cost system.

### 1. UNIT COST IS AVERAGE TOTAL COST

The microeconomic framework is largely concerned with the issue of marginalism and addresses concepts such as marginal cost (MC),<sup>30</sup> marginal revenue

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<sup>30</sup>Marginal cost (MC) is defined as the addition to total cost resulting from the last unit of output. Mathematically, MC is the first derivative of the total cost function, a mathematical expression of a firm's cost structure.

(MR),<sup>31</sup> and marginal value (MV).<sup>32</sup> The unit cost is the same as the microeconomics concept of average total cost (ATC). Microeconomics recognizes the ATC information, but indicates decisions should be based on the MC, not the ATC. The unit cost concept uses the ATC as a focal point for decision making. Figure 6 represents the ATC (and thus the unit cost curve), and shows how unit cost varies with output.

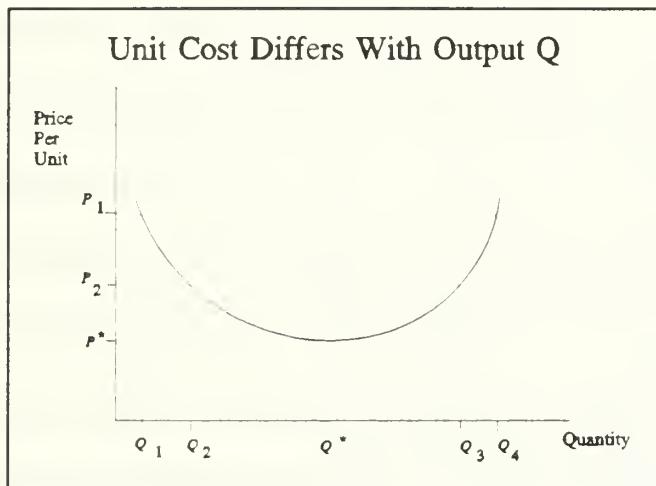


Figure 6

The marginal cost reveals the cost of the last unit of output, or the incremental cost, while the ATC is the result of dividing total costs, including fixed costs, by the expected level of output. ATC varies with every level of output as a result of allocating fixed costs over all units of output at each output quantity. The MC also

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<sup>31</sup>Marginal revenue (MR) is defined as the increase in total revenue from the last unit sold. In perfectly competitive firms, MR is equal to price since each firm is a price taker. This relationship gives a perfectly competitive firm a demand curve parallel to the X axis since the firm can sell any quantity of output at the market price of P.

<sup>32</sup>Marginal value (MV) in a government context is defined as the increase to total value from spending another dollar on a project.

may vary with output, but this is a function of changes in operating costs and not allocation of fixed costs as output changes.

## 2. INCREMENTAL, TOTAL AND UNIT COSTS

Knowing incremental costs is particularly valuable as the DoD budget declines because cost-performance tradeoffs must be made in changing the military force structure. Some believe unit cost can help provide the total and incremental cost of DoD line operations. However, MC and not unit cost represent incremental costs. The total of unit costs incurred by a consumer (end user line activity) overstates the amount that would be saved if that consumer were eliminated from the DoD force structure.

An example illustrates this point. Suppose the Navy were to eliminate one carrier battle group and the corresponding airwings. Unit cost can be used to calculate how much output the battle group consumes. Rationalizing that this amount represents the savings by eliminating the battle group is incorrect. All the activities that produce the output the battle group consumes have some fixed costs. By eliminating the carrier battle group demand, (in the short run) the same fixed costs must now be spread over a smaller demand base. The unit cost to all remaining consumers increases. Savings result from eliminating the battle groups. But the level of saving is the sum of the MC of the output consumed, not the total of the unit costs. MC are the incremental cost, not the unit cost.

A factual example underscores the importance of differentiating unit cost from incremental cost. Congress wanted to know the incremental costs of the War with Iraq to properly fund DoD costs incurred. Congress realized these costs exceeded amounts appropriated for FY 1991 peacetime operations and DoD is therefore entitled

to additional funding, but only for the incremental costs. The existing accounting system is inadequate to provide such data. Interviews with congressional staff members and the Chairman of the House Budget Committee indicated the mistaken impression that the unit cost concept might better support the development of incremental cost estimation for future operations. (Johnson, 1991, p. 73)

### **3. TECHNICAL AND ECONOMIC EFFICIENCY**

Technical efficiency is defined as obtaining the maximum output for a given input, or minimizing the cost of a given output. Technical efficiency is achieved when the producer operates at any point on the ATC. In contrast, economic efficiency occurs when resources are used to produce the highest possible social value. If the objective is to maximize economic efficiency, then the objective is to maximize the *value* of the government resources used. To achieve this, government producers should produce output at the point where  $MC = MV$ , as shown in Figure 7. This requires that price<sup>33</sup> be set according to  $MC (P^*)$ , not  $ATC (P_{UC})$ .

Unit cost sets price at the point where the ATC crosses the demand curve and total cost equals total revenue. However, at this point the  $MC > MV$  and the output is overproduced even though the producer will breakeven. Technical efficiency may exist, but if the producer is overproducing, there is economic inefficiency. Presumably, the

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<sup>33</sup>In this discussion, price is assumed equal to unit cost. Although this was demonstrated as not always the case in Chapter 4, the assumption is considered valid because OSD intends that in the aggregate, total unit cost earnings paid producers will equal total unit cost prices charged to consumers.

excess resources used could have been employed elsewhere in a manner that would have yielded a higher MV.

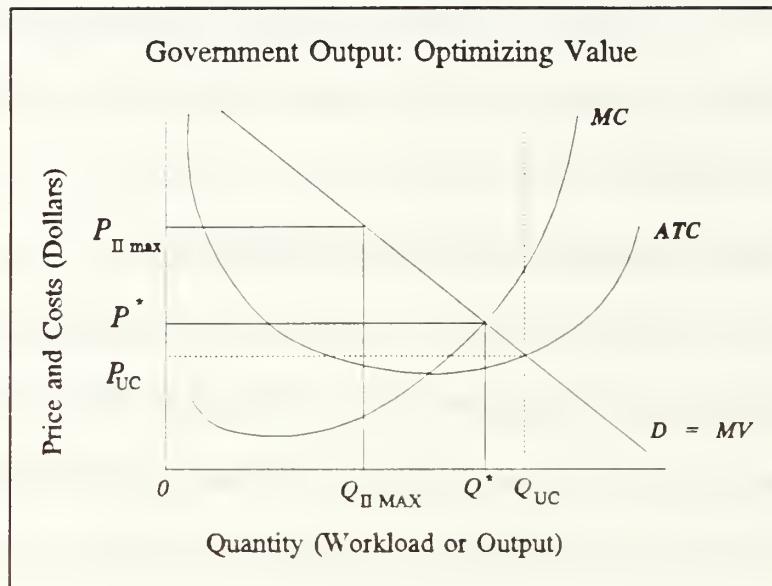


Figure 7

#### 4. MARGINAL COST INFORMATION IS DESIRABLE

The MC provides valuable information necessary to evaluate the optimal output level. Unfortunately production functions and total cost functions are complex to determine. Despite possible difficulties in determining the MC, the Office of Management and Budget (OMB) in OMB Circular A-11 indicates that it is indeed desirable to determine the MC. The Circular states (italics added):

[Budget] Estimates will be based on the most economical and efficient manner of carrying out the work of each agency. For this purpose, unit (average) cost information should be developed to permit comparison and analysis to determine whether program costs are minimal. *Where possible, costs should be divided into fixed and variable components so that marginal costs can be derived in addition to fixed costs.* Such information will also provide a credible base for projections of future costs and the need for budgetary resources...

In contrast to the MC, the ATC (unit cost) is easily obtained by collecting historical data (cost accumulation) and predicting output levels. The ATC is conceptually simpler and easily executed. It is expected that when a new standardized DoD-wide accounting systems is introduced and OSD continues to upgrade information technology, providing unit cost data will become easier. It is possible that accounting systems will be integrated with the unit cost programs and will automatically provide the ATC calculation. Under these conditions, each activity may be able to easily and functionally develop its own unit cost as along as "approved" projected output numbers are provided for the next year. This will provide better cost information on an activity specific basis and could possibly eliminate the need for a component area goals.

## **E. OBJECTIVE 1: IMPROVE PRODUCER EFFICIENCY**

Encouraging efficient production and improved resource usage is a primary focus of the unit cost concept. However, there are various notions as to what efficiency means. This sections discusses efficiency in several respects and explores related issues.

### **1. THE PROFIT MOTIVE**

Microeconomics assumes that the primary motivation for firms to continue business operations is the ability to earn a profit. Businesses maximize profits by minimizing costs and optimizing production decisions. As defense producers become more businesslike, it is reasonable to assume that these producers will be motivated to behave similarly. If they can lower costs, then producers can indirectly manipulate price over time by providing output at a lower unit cost. Assuming demand is price sensitive,

the lower the price the more quantity consumers are willing to purchase. If a producer does not lower prices and consumers can choose between producers, consumers will "vote with their feet" and seek other producers to satisfy their needs at a lower cost.

Potential competition should compel defense support organizations to become more technically efficient since this is the only way producers can influence price and produce a profit or stay in business. This is an extension of the OSD desire for DoD producers to become "more business-like" and would tend to support the OSD goal that unit cost resourcing will improve efficiency.

## **2. SATISFYING ALL DEMAND: AN EXAMPLE PROBLEM**

Defense producers are obligated to provide customers all output requested. If demand is less than the predicted amount, then producers easily understand the need to reduce costs because they assume they will receive inadequate earnings to cover costs.

However, when demand exceeds predicted demand, the producer may also be at risk of having a loss. This is because defense producers may be forced to sell the last unit of output at a price which is below the incremental cost of producing that output, that is where  $MC > MR$ . This notion is important to understand because under the unit cost concept, as demand increases so do earnings. Some managers think that once they have exceed the "breakeven point," (i.e., the predicted output) that all costs will be covered. Figure 8 graphically shows how this notion can be incorrect, depending on the total cost function. The output  $Q_D$  is actually requested when  $Q_{UP}$  was predicted. At output  $Q_D$ , the total earnings is less than total cost and results in a loss.

The point here is that producers are deemed to have achieved technical efficiency if they are producing on the average total cost curve. This means that if a producer meets unit cost goals and is technically efficient, unit cost will appear to be achieving the objective of improving efficiency for that producer. However, when there is a substantial imbalance between actual and predicted demand, it may appear that the producer is not working towards achieving unit cost goals.

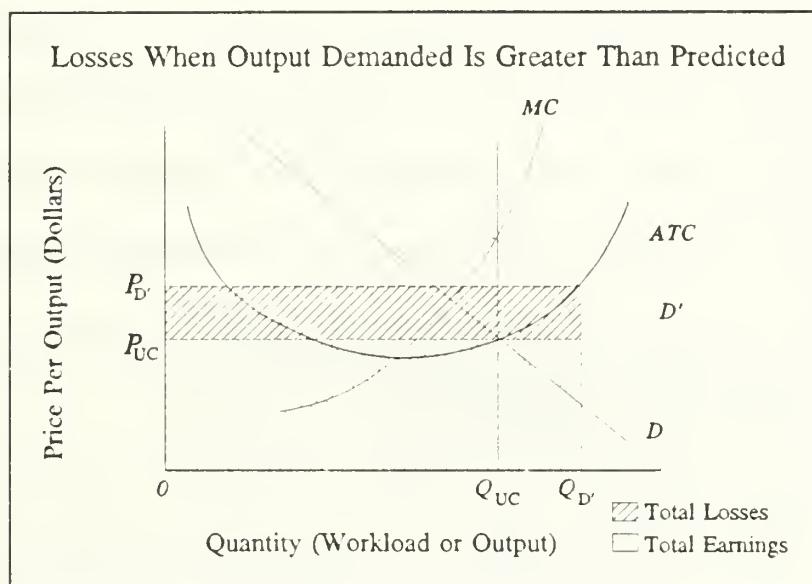


Figure 8

The solution to the problem of imbalance between predicted and actual demand appears simple. The UNIT COST RESOURCING GUIDANCE indicates that if a component is unable to meet a unit cost goal, the component may request an increase in the goal. However, because defense producers do not know their total cost functions, and therefore cannot know their MC, the agency may find it difficult to justify increasing the unit cost goal on the merit of the underlying problem. In this case, the problem is satisfying a demand level at a point where  $MC > MR$ . The agency may justify the need

for a higher unit cost by relating cost and demand increases. This is a crude attempt at determining MC. If the total cost function were known, demand and corresponding cost increases would have been predictable.

In response to a request for a higher unit cost goal, OSD would likely review whether the component took effective actions to lower costs and obviate the need to increase the unit cost goal. Because the unit cost is a composite rate for all activities in the functional area, it is difficult to isolate the significance of the contribution to overall cost from a single activity. A functional area production function could be built that would treat the individual curves as additive, but the resultant MR and MC information would be of little value to the individual activity. To adequately address the problem, each activity should determine the activity specific production function.

### **3. EFFICIENCY IN PRACTICE**

Calculating the unit cost goal is an exercise in data accumulation and output prediction. There is no consideration for the economically optimal value of resources used; economically efficient output is achieved by coincidence. Unfortunately, some consider the *magnitude* of the unit cost as an indicator of efficiency, especially when comparing activities and performance. This is deceptive at best and may foster an environment that leads to inappropriate decisions. This point is further discussed in section G below.

The unit cost goal is highly sensitive to quantity changes and total cost allocations sensitivity to technical (production) efficiency is less clear. In other words, unit costs may be lowered by increasing expected demand, moving costs among different

outputs or changing allocations of indirect or G&A costs; these actions clearly have no effect on efficiency. Alternatively, a technical efficiency improvement may reduce the MC, but have no impact on fixed costs. Thus, the unit cost may be relatively unaffected, depending on the ratio of fixed to variable costs and the quantity of predicted output.

However, it is reasonable to view differences in unit costs across producers or changes in the unit cost for a particular producer as an indication that the area deserves investigation to understand the unit cost changes. For example, changing a management or production process that lowers the ATC (unit cost) at all output levels indicates an efficiency improvement. Indeed, this is a change to the production and total cost functions, so the ATC and possibly the MC will be lower.

## **F. OBJECTIVE 2: ENCOURAGING CONSUMER RESTRAINT**

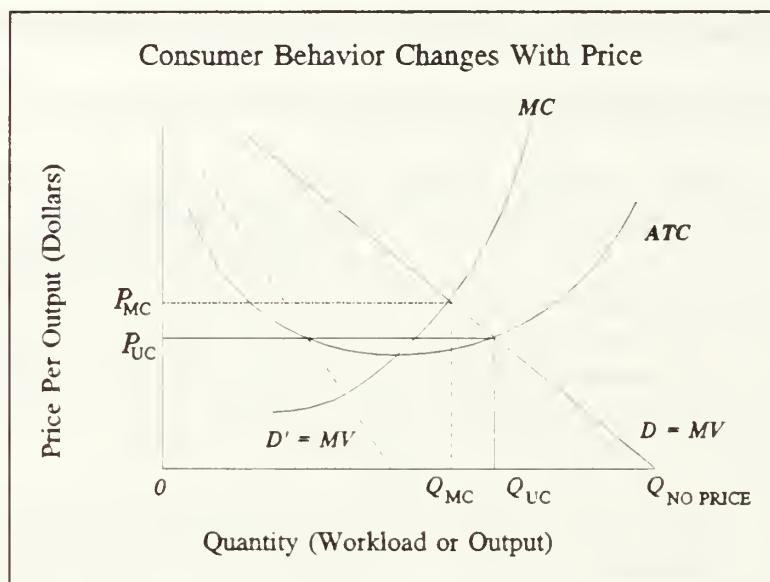
Consumers are affected by price changes as a result of the unit cost concept implementation. It is assumed that consumers are price sensitive. Figure 9 provides a graphic illustration of how price changes may effect consumers.

Referring to Figure 9, on a demand curve D, which is the consumers MV, if output were free, consumers would demand output to the point where the curve crosses the x-axis. As price increases, the quantity demanded diminishes. The optimal point of production is where  $MC = MV$ . At this point a quantity of  $Q_{MC}$  would be demanded.

However, because producers are providing output at the point where  $MV = ATC$ , output is actually being overproduced. A greater quantity than needed,  $Q_{UC}$ , is provided. Note that if the demand were different, such as a demand of  $D'$ , the unit cost would be

the same because both demands cross the ATC curve. In this case, the quantity of output is actually under produced.

Both cases serve to illustrate that the unit cost in fact has the desired effect of reducing consumption as prices increase. The price increase communicates to the consumer the magnitude of resources consumed in providing output. Such information seems to encourage consumers to consider price in consumption decisions. However, the optimal point of production,  $MC = MV$ , is not apparent, so production maybe more or less than optimal.



#### G. OBJECTIVE 3: IMPROVE DECISION MAKING/EVALUATIONS

OSD leaders believe that the unit cost concept will encourage better decision making by providing new information and focusing management attention on cost data. This section briefly discusses two areas associated with decision making: (1) comparing

producers; and, (2) decision makers planning horizons. In these cases, the unit cost concept plays a significant role in the information the system provides and the incentives provided managers in accomplishing their missions.

## 1. DECISION MAKING

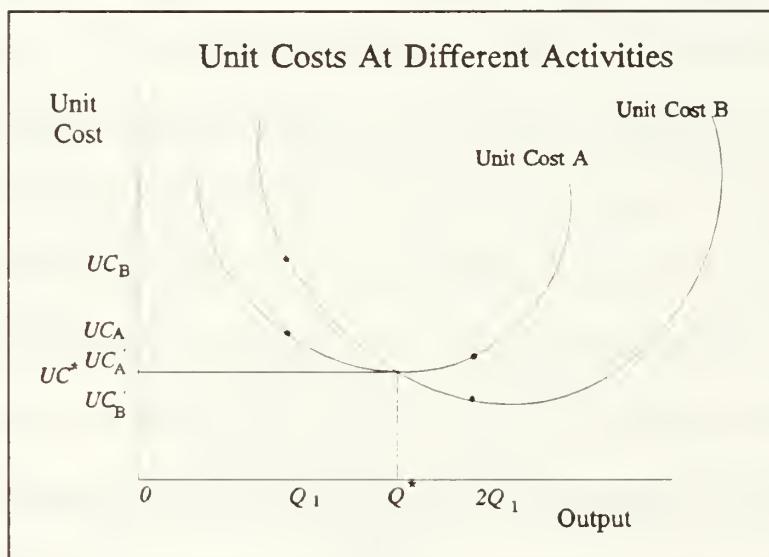
### a. *Information For Decision Makers*

The unit cost concept can lead decision makers to understand efficiency in terms of the magnitude of the unit cost which, as previously discussed in section E.3, may have little bearing on efficiency. Significant reliance on unit cost information can provide distorted or ambiguous data on which to make decisions. The user must recognize the significance of: the annual business assumption (i.e., assumed output); know the costs accumulated; understand the relationship between the different types of outputs; know what outputs are unmeasured; and, know the output used to determine the unit cost. It is false economy to base decisions only on unit cost information.

A graphic illustration of this point is a hypothetical case where one of two bases (producers) must be closed. Both bases provide the same output. Figure 9 shows the ATC (unit cost) curves for these producers. If the decision criteria is solely (or even largely) a function of the unit cost comparison, the activity with the higher unit cost would be closed. However, unit cost as an efficiency proxy provides conflicting indications at different output levels. At  $Q_1$ , in Figure 9, Producer A appears more efficient than B as  $UC_A < UC_B$ . But at  $2Q_1$ , the reverse appears true as  $UC_A > UC_B$ .

Given only unit cost information, decision makers cannot unambiguously arrive at the proper conclusion of which producer is most efficient.

A proper decision would be based on expected demand and an examination of the relative MC for each producer at various demand levels. Thus, for demand expected in the range of  $0 - Q^*$ , Producer A should be kept. If demand were expected to fluctuate both above and below  $Q^*$ , then it is important to consider how costs change as demand fluctuates over this range. If demand were predicted to exceed  $Q^*$ , Producer B should be kept. This case over-simplifies the decision variables but illustrates the danger of relying solely on unit cost information.



**Figure 10**

*b. Decision Makers Are Short Term Oriented*

Good DoD civilian managers and their military counterparts tend to remain in their jobs for fairly short periods. J. R. Fox states, "The best [officer and civilian managers] end up staying the shortest time because they get promoted or assigned

to a better job." (Fox, 1988, pg. 177) Commenting on the planning horizon DoD managers may have, Fox says:

Because of the military policy of relatively short assignments [speaking specifically of military officers], performance incentives are geared to the success of short-term tasks. ...progressing efficiently toward long term program goals are seldom rewarding activities. They may lead to ultimate program success, but seldom lead to outstanding performance rating for the manager. (Fox, 1988, pg. 185)

In other words, to make an impact, organizational leaders are motivated to seek short term "fixes" (among often mutually exclusive alternatives) to meet one-year unit cost goals rather than implement long term solutions. This is not consistent with the long term outlook successful competitive firms must take and may serve to undermine the long term benefits of the unit cost concept.

## 2. EVALUATIONS

OSD leaders have indicated that the unit cost system would improve the ability of management to evaluate personnel performance by establishing the common objective of successfully attaining the unit cost goal. (Shycoff interview, 1991)

### *a. Personnel Evaluation and Quality of Output*

Currently, DoD civilians are rated against performance elements documented in Position Descriptions (PD). Managers normally formulate PD elements jointly with employees and review them during the evaluation period. To the extent practical, PDs should contain objective measurable performance or quality indicators such as maximum number of errors allowed for a function. In addition, the PD elements should be controllable by the employee.

The justification for using unit cost goal attainment as an evaluation basis lies in the fact that it is objective: the goal is either met (attained) or not. Further, employees in other activities, even if they are in a different functional area, are working with a common system and goals established in a similar manner.

Establishing a personnel evaluation system based on attaining unit cost goals is difficult. The constraints government managers operate under are conflicting in nature and difficult to balance in practice. Specifically, four constraints associated with the unit cost system are:

- (1) The price for the output is set by higher authority;
- (2) Managers have strong incentive to "breakeven;"
- (3) Producers are obligated to satisfy all demand; and,
- (4) The workforce, arguably the largest cost in government production,

behaves more like a fixed cost and is relatively inflexible to changing demand.

It can be argued that these same constraints (except price) existed under the fixed budget method of resource allocation. They did, but the difference here is that the suggestion of basing an evaluation system on attainment of unit cost goals subjects managers to constraints largely beyond his sphere of control. In essence, a manager could be judged "good" or "poor" as a result of the accuracy of the output prediction.

A central concern is that if personnel performance were to be tied to the unit cost goal attainment, managers would have strong incentive to "game" the system. It is most likely that *quality* of output will suffer since that is the one variable manager can exercise considerable control over. Furthermore, in many organizations quality

problems can remain undetected for long periods of time. Given the short term orientation of DoD managers previously discussed, this issue should not be considered lightly. Until a means to determine what a manager can control and what he cannot, it may be prudent to exclude attaining unit cost goals from the evaluation system.

*b. Organization Evaluation*

Unit cost can lead decision makers and evaluators to think of the unit cost goal as an indicator of efficiency. Evaluating organizations as "good" or "poor" because of the relative magnitude of the unit cost goal serves little purpose. Important issues like size, geographic location, cost of living, relative modernization of the facility and a host of other factors that drive costs are not communicated through the unit cost goal. Similarly, unit cost does not communicate the quality of performance or the value that the organization provides to the system as a whole. In evaluating organizations, the cost of the organizations should be one of many factors considered.

## **H. CHAPTER SUMMARY**

This chapter has analyzed the unit cost system objectives using a microeconomic framework. There are several important points highlighted in this chapter:

(1) The unit cost concept communicates the average total cost (ATC) of production not the marginal cost (MC) of production. Microeconomics argues that decisions should be made on the basis of the MC and not on the ATC which is output dependent;

(2) If defense producers are assumed to be more business-like, and to become like competitive firms, then producers are compelled to become more efficient in order to achieve profit or gain sharing;

(3) Consumers will reduce consumption for two reasons: (a) producers have incentive to ensure customers are paying for all output; and, (b) prices to consumers will increase and it is assumed customers are price sensitive;

(4) Decision makers must be aware of the ambiguities of the unit cost information and ensure other factors are considered in decision making;

(5) DoD decisions makers are short term oriented, and the current method of implementing the unit cost concept does not seem to improve decision making by encouraging long term decisions;

(6) Basing personnel evaluations on attaining unit cost goals as the concept is currently being implemented would not be prudent. Currently the evaluated personnel may have too little control over many of the costs in the unit cost goal. Implementing an evaluation based on unit cost goal attainment could provide incentives to "game" the system and possibly result in lower quality output.

## VI. BASE OPERATING SUPPORT COST ALLOCATION

Thus far, this thesis has examined the overall unit cost system. This chapter focuses on a specific portion of the unit cost concept namely, Base Operating Support (BOS) cost allocation. The chapter defines BOS costs are and discusses why DoD needs a cost allocation method, the distortion inherent in allocating costs, and the new thinking the business world has adopted to reduce allocation distortion. Lastly, the chapter includes the methodology OSD has directed DMDC to use to allocate BOS costs for use in the unit cost calculations.

### A. BOS COSTS DEFINED

In general, BOS costs are those costs associated with operating defense installations. Categories of BOS costs are delineated in Attachment 1 to the UNIT COST RESOURCING GUIDANCE. A general definition of BOS costs from the DoD Base Structure Report for Fiscal Year 1991 identifies the scope and magnitude of BOS costs. The report defines BOS costs as:

...the cost of services -- goods and people -- needed to operate and maintain defense installations so that the operational forces can pursue their mission objectives. This includes:

- Real Property Maintenance Activities - Maintenance and repair, minor construction, operation of utilities, and other engineering support;
- Base Operating Support - Payments to the General Services Administration; administrative and data processing activities; supply operations [other than depots

and ICPs]; maintenance of installed equipment; bachelor housing operations and furnishings; morale, welfare and recreation activities; and other base and service personnel support;

- Construction - Military construction, including family housing new construction and improvements;
- Family Housing Operations and Maintenance - Family housing and management, services, utilities, furniture and equipment, leasing maintenance, and repair.

## **B. ALLOCATION**

### **1. A COST DEFINITION REVIEW**

Before proceeding, a brief review from the Chapter III discussion on costs is appropriate. There are three types of costs: (1) direct costs; (2) indirect costs; and, overhead or general and administrative costs (G&A)<sup>34</sup>. Direct and indirect costs can be traced to a particular output or set of outputs. G&A costs, however, cannot easily be identified to an output and generally there is no direct or causal relationship between output and G&A costs. Accordingly, to recover G&A costs, some type of allocation method must be devised which will spread G&A costs over output to enable producers to recover costs.

### **2. THE NEED FOR A COST ALLOCATION METHOD**

In FY 1991, Base Operating Support (BOS) costs accounted for almost ten percent or \$26.5 billion of the DoD appropriated funds. Traditionally, BOS costs have

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<sup>34</sup>The terms G&A, BOS and overhead will be used interchangeably. However, some G&A costs may be allocated internally and not allocated using the BOS allocation method.

been treated as overhead costs. The UNIT COST RESOURCING GUIDANCE specifically defines BOS costs as part of the overhead or G&A costs incurred in a defense support activity output. Activities that operate under the unit cost concept must have a method of spreading or allocating BOS costs to output since the unit cost concept is designed to recover all production costs. The practice of allocating cost is a long established accounting practice which gave rise to the discipline of cost accounting and its various forms such as managerial accounting. However, H. T. Johnson and R.S. Kaplan note that cost accounting principles changed little between 1925 and the middle 1980s. (Johnson & Kaplan 1987, p. 10-14)

Government and public accountants have developed guidance or standards which define acceptable allocation policies and practices. For example, business with government contracts meeting certain criteria must adhere to a specific set of standards, known as the Cost Accounting Standards (CAS), developed by the Congressionally appointed Cost Accounting Standards Board. While the CAS sets forth specific procedures, in general the procedures establish a standardized policy or cost accounting framework for allocating costs to government contracts. In most areas, contractors have substantial freedom as to how costs are allocated as long as such allocation schemes are: (1) disclosed; (2) consistent over time; and (3) do not violate standards.

### **3. ALLOCATION PROBLEMS AND SOLUTIONS**

Methods for allocating G&A costs to output are limited only by managerial creativity and the general principle that allocation schemes are reasonable. Through the 1980s, business accounting systems tended to allocate costs on an indirect method. This

was especially true, but not limited to manufacturing concerns. "Pooling" is an example of one commonly used cost allocation method. This method involves combining overhead costs into large, frequently plant-wide, "overhead pools." For each overhead pool, managers choose some measure (such as direct labor hours or area occupied) for allocating the cost to individual cost centers. These costs would be reflected in the cost of the output from each cost center. Ultimately, all costs are reflected in the output price.

Recent changes in management thinking and cost accounting practices now recognize that cost systems that indirectly allocated costs, such as overhead pooling, introduce information distortions. R. Cooper and R. S. Kaplan assert that indirect cost assignment causes distortion in five ways. These are by:

- (1) Allocating unrelated costs to the output;
- (2) Omitting costs related to a product;
- (3) Costing only a subset of the output;
- (4) Indirectly assigning costs inaccurately to products, which results from:
  - (a) Price distortions, introduced when the cost system is too aggregated and average prices are used instead of specific prices;
  - (b) Quantity distortions, introduced when costs are assigned to products on a basis not perfectly proportional to the resources consumed;
- (5) Allocating joint or common costs.

The authors argue that the distortions can be removed by carefully designing the product costing system. As an example they state:

...well-designed cost systems ensure that all major outputs are treated as products and the costs of the resources consumed in their production are assigned accurately to them. Other sources of distortion may not be worth reducing because the cost of reduction exceeds the benefits derived. The optimal product cost system for a firm, therefore, is not the most accurate one but the one where the benefits of additional accuracy are matched with the expenses of achieving the next increment in accuracy. The best system will report approximate but inaccurate product costs, with the degree of approximation determined by the organization's competitive, product, and process environment. (Cooper & Kaplan, 1991, pp 3-4)

Indirect cost systems such as the pooling method, are generally simple and inexpensive, but potentially grossly inaccurate. Implementing new or improved cost information systems and reducing distortions will enable managers to better see the "real story," at a cost-accuracy tradeoff; as accuracy increases, so does cost.

The concept of activity-based costing, and a more generalized form called activity-based information, has become widely adopted to overcome information distortions caused by traditional indirect cost assignment caused. Business managers have come to recognize that profitability is more than an exercise of cost control. H. Thomas Johnson says:

A new approach to management accounting must be built on "activity-based information." This information is about the work (or activity) that consumes resources and delivers value in a business. People consuming resources in work ultimately cause costs and achieve the value customers pay for. (Johnson, 1988, pp. 22-30)

There is no evidence to suggest that business is uniquely the victim of cost system information distortion and the federal government is excluded. To the contrary, as the OSD leadership moves DoD support operations and management to a more business-like basis, defense support activity managers and OSD decision-makers may be receiving distorted data, yet lacking private business experience, may fail to realize it.

DoD managers at every level must be knowledgeable of information distortion and make appropriate cost-accuracy trade-offs.

### C. THE BOS ALLOCATION ISSUE

Allocating BOS costs is more than simply determining how to allocate cost among outputs. BOS costs are associated with operating installations. Most often, operational forces and support activities coexist at the same installation. The issue then is that BOS costs must first be allocated to activities and then, each defense support producer to allocate costs among outputs. The unit cost concept treatment of BOS and G&A cost allocation is largely driven by the mission or output in which the cost was incurred. While that is one method of allocating cost, this thesis generally addresses the issue of cost allocation from the perspective of cost drivers and benefits.

An allocation scheme that allocates installation costs to activities should be congruent with unit cost objectives. The intent of implementing the unit cost concept is to improve management awareness of cost and hold managers accountable for costs. In allocating the cost of operating installations and making that allocated cost part of the unit cost, the unit cost system may hold managers accountable for costs over which they have no control. Thus, if the goal is to manage cost more effectively, the BOS allocation scheme should provide allocations that support this end. The remainder of this chapter and the next chapter will address the first problem, that of allocating BOS costs among activities. In general, is done from the perspective of cost drivers (i.e., those actions that incur costs) and the activities that benefit from the costs incurred.

## D. THE DOD BOS ALLOCATION METHOD

A DLA document, entitled "Unit Cost Resourcing Policies and Procedure," dated 15 October 1988, states many of the principles DoD has institutionalized as part of the unit cost resourcing effort. Regarding allocation, the document states:

Accounting practices also recognize that this [allocation] must be done in a reasonable manner. Thus, those costs that cannot be easily identified to a product can be based on an allocation determination that will stand the test of reasonableness.

This document implies that cost allocation must be accomplished on a reasonable basis whether the allocation is for internal activity purposes or across activities. The reasonable basis OSD has selected is people. The UNIT COST RESOURCING GUIDANCE states:

G&A [includes BOS] costs incurred within a unit cost function shall be allocated to the outputs of the function on the basis of personnel associated with (assigned) to the output of the unit cost function. It is recognized that personnel may not, in all cases, be the best basis for allocating G&A costs. However, pending further refinement and input from the DoD Components, personnel assigned appears to be the most consistent and reliable methodology. Personnel assigned is defined as the number of civilian and military personnel assigned to the installation, major command, service or agency.

In other words, BOS costs will be allocated on the basis of the pro-rata share of the total BOS cost to each activity at an installation based on the number of personnel assigned to each activity as a percentage of the installation population. DMDC accumulates BOS costs by using service specific cost accounting codes<sup>35</sup>.

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<sup>35</sup>The cost accounting codes differ by service. The Navy uses Cost Accounting Costs (CACs). Definitions for CACs are in the Navy Comptroller Manual, Volume II, paragraph 024640.

A simple example illustrates this method. Suppose one installation has three activities (A, B and C) and the total BOS cost at the installation is \$10,000. Activity A has 25 personnel, Activity B has 40 personnel and Activity C has 35 personnel assigned. The OSD selected allocation scheme would allocate \$2500, \$4000 and \$3500 to activities A, B and C respectively, regardless of the differences among the activities.

This allocation method was adopted for three reasons: (1) the method is conceptually simple and thus easy to program; (2) OSD leaders wanted to quickly implement the unit cost concept and DMDC maintains a database which contains the manpower information; and, (3) "personnel" represents a common denominator among activities and is considered a "reasonable" basis.

The OSD method of allocating BOS costs is a "pooling" method, and the base used is personnel. As such, it is an indirect allocation method subject to the five sources of data distortions discussed in section B.3. These distortions are: (1) allocating unrelated costs to the output; (2) omitting costs related to a product; (3) costing only a subset of the output; (4) indirectly assigning costs inaccurately to products as a result of price and quantity distortions; and, (5) allocating joint or common costs. The distortions could affect defense decisions.

The need to determine the total BOS costs and allocate these costs among activities is a significant part of the unit cost implementation effort. As such, it has became a major tasking for DMDC. DMDC needed to build command host-tenant relationships and devise the programs to extract appropriate data from the Uniform Management Reports. The results of the DMDC effort are discussed in Chapter VII.

## E. CHAPTER SUMMARY

This chapter reviewed the reasons OSD requires a Base Operating Support (BOS) cost allocation method, problems and data distortions inherent in indirect allocation schemes and current business management thinking on how to approach the problems. The chapter is concluded by describing the method OSD has selected for BOS allocation.

To provide component-level data, the unit cost programs aggregate costs and allocate them indirectly. It is reasonable to suggest that the OSD-selected allocation scheme introduces considerable distortion into the unit cost goals as R. Cooper and R. Kaplan explain, citing five sources of distortion related to aggregating data and allocating costs indirectly.

The next chapter will analyze the OSD allocation method by examining the DMDC allocation program and comparing DMDC-provided data and field collected data. An example allocation scheme is developed and compared to the OSD allocation method.

## **VII. BOS PROGRAM STRUCTURE AND DATA ANALYSIS**

This chapter describes the program developed by DMDC and approved by OSD to allocate Base Operating Support (BOS) costs for use in calculating unit cost goals. Additionally, the allocation method is analyzed by reviewing DMDC ad hoc query reports and by comparing expected output from the DMDC program to an example allocation scheme developed based on data collected from field activities.

This chapter does not propose an alternate allocation scheme nor suggest that the OSD-selected model is wrong. As discussed in Chapter VI, indirect allocation methods are subject to distortion. The example alternative allocation method presented in this chapter is also an indirect allocation system and introduces distortions. However, because the scheme introduces at least one more allocation basis and costs are selectively allocated, distortions may be mitigated to some degree.

### **A. BOS ALLOCATION PRINCIPLES AND COMPLICATIONS**

In principle, the BOS allocation system is merely determining the total BOS costs at each installation and then allocating those costs to each activity for inclusion into the function area unit cost goal. The allocation is made on the basis of the percentage of the installation population each activity represents. From the DMDC perspective, the principles of this scheme are easier to articulate than it is to program.

As the Central Design Agent for the unit cost program, DMDC is responsible for developing and maintaining the DoD-wide unit cost concept program. Problems currently facing DMDC in establishing the BOS allocation programs for the Navy include: complex, overlapping and confusing host-tenant relationships; component specific cost accounting differences; missing data; and, poor component support to resolve problems.

## **B. BOS ALLOCATION PROGRAM STRUCTURE**

Appendix B provides a graphic model of the Unit Cost System Design. For the Navy, calculation of the BOS cost allocation starts with identifying three elements:

(1) The number of civilian and military personnel assigned to each activity.

Personnel have been designated as the allocation base. The number of personnel assigned to activities is extracted from the data base DMDC maintains on the civilian and military workforce;

(2) Installation host-tenant relationships. This information was built as part of the Navy BOS cost allocation programming effort in summer 1991; and,

(3) The proper costs to accumulate. A table, which is part of the program system, identifies the BOS costs by Cost Account Code (CAC).<sup>36</sup> This information was developed using CACs found in the Navy Comptroller Manual Volume II, paragraph 0242640.

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<sup>36</sup>The "table" concept was programmed into the most recent version of the DMDC system of programs that provide unit cost data. Previously the CACs were a part of the program code.

These elements are merged together to form the Base Operations File (ABOP).

The ABOP is keyed to installations by a DMDC-assigned base identification code (BASID). Individual commands are cross referenced to the BASID by the command unique Unit Identification Code (UIC), creating the host-tenant relationship, explained below. The BOF file is then matched against the Cost Account Financial File (CAFF) which provides the actual financial (cost) data. Cost account data that does not match a BOF record is placed in a suspense file for further research. The merger of the BOF and CAFF create the Master Base Operations File (BASEOP). This is the file from which the various kinds of reports are generated. Here, the total of BOS costs allocated from all installations is accumulated and applied to the functional areas as a G&A cost.

## **C. HOST-TENANTS: THE HEART OF THE BOS ISSUE**

The DMDC allocation program is driven by the "host-tenant" relationship, and missions assigned to each UIC. The host-tenant relationship is built by linking BASIDs and UICs. The host-tenant relationship and related issues are further explained here.

### **1. THE HOST-TENANT RELATIONSHIP**

Most installations are organized such that there is a single command responsible for providing "landlord" type services. The landlord is called the "host." Commands that receive services from the host are called "tenants." Services provided include operations and maintenance of the installation, facilities and real property, administration and administrative support, military personnel housing, personnel support and other services that enable commands and personnel to utilize the installation to

pursue mission objectives. (A detailed listing of the costs of these is provided as Attachment 1 to the UNIT COST RESOURCING GUIDANCE.)

Host commands historically have been provided services as part of their mission. Traditionally, they have been funded with fixed budget to provide a certain level of service to tenants on a non-reimbursable basis. This is called "mission funded." When a tenant desired service beyond the scope of the mission funded service level, the tenant requested and received service on a reimbursable basis.

Under the fully implemented unit cost concept, mission funded service will no longer exist. All services (BOS costs) will be allocated to some output and the costs will be reflected as G&A in the unit costs.

## **2. BASID AND UIC ASSIGNMENT PROBLEMS**

Assigning UICs to BASIDs is a logical method to establish host-tenant relationships necessary to allocate BOS costs. UICs appear to be assigned to only one BASID. There are two significant issues that arise as a result of assignment of UICs to only one BASID, referred to here as "cross allocation" and "free riding."

### *a. The Cross Allocation Problem*

It is important to note that the host-tenant relationships can often overlap or "flip-flop." In such cases it could be appropriate to allocate BOS costs from host to tenant in both directions simultaneously. An example serves to clarify this point.

Commander, Naval Supply Center San Diego (NSCSD) "owns" and occupies a building and serves as a host to several commands. Commander, Naval

Station San Diego (SDNS), the host at the Naval Station, occupies some space in the NSCSD compound. In this case SDNS is the tenant at the NSCSD compound. However, NSCSD operates warehouse space at the SDNS. In this case NSCSD is the tenant at the naval station. In this example, it would be appropriate to allocate a share of SDNS BOS costs to NSCSD for warehouse operations. Likewise, it is appropriate to allocate a share of NSCSD BOS costs to NS for the space they occupy in the NSCSD compound. For convenience, call this "flip-flop" allocation, "cross allocation."

The BASID report seems to display organizations arranged in a hierarchical relationship (with respect to host-tenant relationships). The BASID file seems to have UICs assigned only once to a particular BASID. In assigning a UIC uniquely to a BASID, cross allocated BOS costs cannot occur. This causes a failure to cross allocate BOS costs and diminishes the matrix nature of Navy organizations providing support to one another.

#### *b. BOS Cost Free Riders*

Assigning UICs to only one BASID causes a problem perhaps more serious than failure to cross allocate costs. There are cases where the BOS costs are assigned to a particular BASID, but many activates receive the benefit of the cost incurred. Activities that do not receive a portion of the cost are said to "free ride." Because some activities are free riding, activities assigned to the BASID where the BOS cost are charged receive a disproportionately larger share of BOS costs.

An example of this is the cost of San Diego area fire protection services funded by the Commander, San Diego Naval Base (CSDNB) and servicing all Navy

commands in the San Diego area. Fire department costs for CSDNB were almost \$16.5 million in FY 1990. CSDNB (UIC N00242) is attached to San Diego Naval Supply Center (BASID 02006005). Under the DMDC program, the BOS costs will be allocated only to those activities assigned to BASID 02006005, which represent a small percentage of the total number of commands in the San Diego area. These comments are based on a review of DMDC BASID reports that displays the cross reference between the BASIDs and UICs supported at each installation.

### **3. BASID AND UIC ASSIGNMENT CORRECTION**

It is not known if the program structure is unable to accommodate the inter-relationships or if the inter-relationships simply have not been entered into the data base. The second alternative is likely since DMDC lacked adequate data from the Navy when the Navy BOS programming effort started in the summer of 1991. In either case, it seems clear that not cross allocating BOS costs increases the distortion in the unit cost reports.

The OSD and DMDC should consider methods to correct this issue. One method would be to revise the BASID files to reflect the need for cross allocation between and among commands. However, DMDC can not do this without significant Navy assistance. NAVCOMPT collected BOS cost data during November 1990. This data could be compared to the BASID file on a case by case basis to determine which UICs should be added to particular BASIDs. Unfortunately, this is probably a manual effort. Alternatively, a new request to installations to provide a machine readable copy

of the commands they support, prepared with a commonly used data base program, might provide the information needed and reduce the manual effort.

#### **4. INTER-SERVICE SUPPORT AGREEMENTS**

The UNIT COST RESOURCING GUIDANCE indicates it is desirable for host activities to execute agreements with each tenant who receives services from the host. The agreements, known as Inter-Service Support Agreements (ISA), are a contract between the service provider (host) and service receiver (tenant) and set forth what service will be provided and what payment is expected.

Services can be provided on a reimbursable or non-reimbursable basis, depending on how activities are funded, the nature of the service and the relationship between commands. Frequently, activities within the same major claimant will establish non-reimbursable ISAs. Across claimants, the host usually desires reimbursable funding for service provided, unless the activity is mission funded to provide such activity.

#### **5. ACCOUNTING SYSTEM SHORTFALLS AND ISAS**

Ideally, all the support a host provides would be documented in reimbursable ISAs and each activity would pay the agreed price. The amount of BOS costs remaining would theoretically represent the BOS costs for which the host is responsible. If this were done, there would be no need to allocate BOS costs as each command has "paid their fair share." Usually, the case is that some of the support costs are paid under ISAs and some of the support costs are non-reimbursable because the host has been mission-funded to provide the support. (Other situations exist, but are omitted for simplicity.)

It would seem logical that if a tenant establishes an ISA with the host which includes all the costs the tenant will incur, then that tenant should be excluded from receiving a portion of the BOS cost allocation. Furthermore, if the ideal situation existed and all host-provided service costs are reimbursable through ISAs, then all tenants should be excluded from the allocation.

Unfortunately, this is not the case. DMDC personnel have indicated that the current DoD accounting system cannot provide sufficient information to enable DMDC programmers to appropriately exclude activities from BOS cost allocations. The accounting system records the reimbursements transactions as they are reported, so DMDC can determine total reimbursable amounts. With this information, DMDC programs deduct the total amount of the reimbursable orders from the total BOS costs allocated.

It would seem that ISAs can potentially establish conditions under which tenants either subsidize each other or the host. When a producer has an ISA and pays the agreed amount, that amount is reduced from the total allocable BOS costs. If another tenant, also a producer operating under the unit cost constraints without an ISA, only pays the allocated amount, the producer with the ISA may be subsidizing the producer without the ISA since both receive an allocation of BOS costs under the DMDC program. Producers should only pay the BOS costs allocated since that is the amount that will be recovered by the unit cost goal. Accordingly, it would appear that tenants should cancel existing ISAs and refrain from executing new ISAs unless they exclude BOS costs since the BOS allocation method will automatically allocate a portion of BOS to the producers.

As an alternative to discontinuing current ISAs, all tenants at an installation could be required to establish ISAs with the host. The host could advise DMDC not to make BOS allocation for that installation.<sup>37</sup> The BOS costs paid on the negotiated ISAs would become internal G&A and treated like indirect costs.

#### **D. DATA AND PROGRAM PROBLEMS**

Assuming the unit cost conceptual framework is sound, (i.e., output definitions are correct, etc.) problems identified in DMDC-generated reports generally come from two sources: (1) the data DMDC used to generate the report is flawed in some way; or, (2) the DMDC program is incorrectly coded thereby producing erroneous reports. DMDC is concerned with both problems. DMDC is not staffed to routinely verify financial data, which is received in machine readable format. Rather, the data is taken at face value, entered into the appropriate database and used for report generation. As reports are reviewed, usually by component representatives, problem areas are noted and DMDC corrects the problems to the extent possible. DMDC personnel appeared highly motivated to correct errors.

As an example of a problem with erroneous incoming data, DMDC personnel took action to adjust for a situation where it appeared local comptroller personnel were using CACs incorrectly. It was noted that many non-supply commands reported costs that reflected outputs which only ICPs or depots should report. The conclusion was that field

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<sup>37</sup>DMDC personnel indicated this condition can be programmed on an installation by installation basis.

activity comptroller personnel were coding local base supply operations with CACs that should only be used by depots or ICPs. DMDC personnel suppressed the generation of ICP and depot costs inappropriately reported by only allowing depot or ICP costs to be identified for depots and ICPs. The depot and ICP costs from the non-supply activities are now reflected in Other Missions. While this solution may not be precisely correct, it is known that the current reporting of ICP and depots costs from non-supply activities is not accurate.

An example of DMDC correcting program related problems is the identification of incorrect or inappropriate host-tenant relations which would lead to an incorrect allocation of BOS. In reviewing the early BASID listings (during the summer of 1991), a number of problems were identified which DMDC personnel promptly corrected.

## **E. COMPARISON METHODOLOGY**

The following describes the methodology for comparing the OSD-selected method of BOS cost allocation to an example BOS cost allocation:

1. Field activities were selected for data collection and field comptrollers were requested, in advance, to accumulate data for review during trips to the field activities;
2. DMDC prepared ad hoc query reports to provide baseline data that the DMDC programs would use to calculate the BOS allocation;
3. The BOS values were developed by a reviewing DMDC baseline data and comparing it to data collected. To the extent possible, inconsistencies were resolved. The allocated BOS costs reflect actual data, but do not necessarily reflect all costs. For example, military personnel costs were omitted since activities do not pay these costs;

4. A roster of personnel assigned to the installation, by activity, was developed by comparing DMDC data to field data. Using this roster, total BOS cost were allocated on the basis of personnel. The allocation results produce "expected" results using the OSD-directed allocation method;
5. An allocation scheme was designed based on the field activity data that was collected. The alternate scheme was applied to the adjusted data resulting in a second allocation;
6. The allocation results based on the OSD method was compared against the alternate allocation method;
7. Conclusions were reached based on the above the methodology.

## **F. LIMITATION OF RESULTS ACCURACY**

The focus of this thesis was not to develop an alternate method. The alternate allocation method is presented for illustration purposes only. The data used to analyze the OSD-selected allocation method is based on actual FY 1990 data collected from field activities during August and September of 1991 and baseline cost data from DMDC reports. The DMDC baseline data was also generated from the FY 1990 data in the DMDC data base. As a result of the adjustments made to the data and possible problems with the DMDC reports as a result of inaccurate UMR reports, the data underlying the allocations is not necessarily reflective of actual operating results. The alternate allocation method is only an example. It serves to point out differences obtained when changing the allocation scheme. The correlation results are not definitive, but highlight the possibility that in the future, alternate allocation methods could be developed that would more accurately allocate BOS costs. An improved allocation scheme could improve the alignment of unit cost goals with the objectives of the unit cost system.

## **1. CONSTRAINTS**

The field data collected was subject to many constraints. Chief among them were: data availability, the ongoing developmental nature of the unit cost program, and the limited time available. A DMDC baseline data report was not available at the time data collection occurred. This report would have helped to identify data deficiencies and provided guidance for data reconciliation during the field activity data collection. The Navy portion of the BOS allocation program was recently developed (summer 1991) and changed during development. There was insufficient time to collect data from every command at each installation visited. For these reasons, the field data collected is incomplete and the DMDC data base cannot be validated. Additionally, paucity of field data constrained the sophistication of the example allocation model.

## **2. DATA INCONSISTENCIES**

Another factor impacting the accuracy of the results is the significant potential discrepancies between the DMDC data and the field data analyzed. For example, personnel, commands related by BASID and military personnel cost, were found to differ between the DMDC data and the field data. Some of the specific differences are addressed under the discussion for each activity. Additionally, there was at least one CAC that was questionable to include as a BOS cost.

## **G. SITE SELECTION AND DATA COLLECTION**

Sites for collecting data were selected on the basis of activity type and proximity to other areas to which travel was desired. Travel was constrained by time and funds available.

DMDC personnel provided significantly more data for San Diego Naval Station (SDNS) and San Diego Naval Supply Center (SDNCS) than other installations. For this reason, the review for these two installations was more detailed than the other installations. However, the example allocation was only done for SDNS. The results are presented in section I. The comments regarding data observations for these two installations that are similar to data at the other installations are not repeated. A data review for Norfolk Naval Base was not completed for reasons explained in the following section. Appendix B lists the activities selected and visited.

## **H. GENERAL COMMENTS FROM DATA REVIEW**

The objective of the unit cost system is to properly align costs with outputs. A similar objective should be to align costs with the activities that derive benefits from the cost. Potential problems with the BASID/UIC assignment tend to undermine this objective. Similarly, over-burdening outputs with costs allows another way to obtain a "free ride."

## **1. FREE RIDING AT SUPPLY ACTIVITIES**

The DMDC report does not display BOS costs for the Oakland Naval Supply Center (NSCO). The NSCO comptroller reported \$35.6 million in direct base operating costs. The absence of BOS costs was also observed on the San Diego Naval Supply Center and Navy Ships Parts Control Center DMDC-BASEOPS reports.

The reason supply activities do not display BOS costs is that NAVSUP and DMDC agreed on which CACs should be included in the depots and ICP functions. The mapping for these CACs is provided in Appendix C. The mapping attributes all of the BOS costs at the depots and ICPs to depot and ICP output. Unfortunately, this scheme appears to overlook the fact that some of those costs are properly allocated to tenants, thus allowing them to "free ride." A review of the ISAs indicates that allocable costs such as command and administration (CAC 1A\*\*) are not being recovered by reimbursement. This is probably because these costs have traditionally been considered mission funded and were non-reimbursable.

NAVSUP should consider reviewing how BOS costs are allocated to tenant activities at appropriate installations and ensure tenants receive a "fair share" allocation of the BOS costs. If costs incurred at supply activities are properly allocable to other tenants, then the supply output functions are being unduly burdened with BOS costs which could make supply output unnecessarily expensive to supply customers.

## **2. BASID REPORT AND ACTUAL TENANTS**

There are inconsistencies between the UICs linked to BASIDs and the tenants that host activities reported. When commands are missing or erroneously assigned to a

BASID, two problems occur: (1) the personnel corresponding to the incorrectly assigned UIC are also incorrectly assigned (present or missing). Depending on command size, this could significantly impact allocations; and, (2) the users of host services are improperly aligned with the costs. Some specific data is provided in the discussions of each activity visited.

## I. NORFOLK NAVAL BASE

The Norfolk Naval Base area, (DMDC BASID 02051006) is home to hundreds of Navy and other military commands. Nowhere is the need for "cross-allocation" more necessary than here. Because of the complexity and command interdependencies, it was determined that reviewing data from this installation placed it beyond the scope of this thesis. However, several observations can be made:

- (1) Norfolk Naval Base (NNB) is not actually a physical installation. The physical bases located within the purview of NNB jurisdiction include the Norfolk Naval Station (NNS), Norfolk Air Station (NAS) and the Headquarters Support Command (HSA);
- (2) DMDC should consider assigning separate BASIDs for the commands listed in paragraph (1). They are identifiable as separate entities and generally provide services to substantially different tenants. By including all these commands into a single BASID, it appears that many BOS costs are being inappropriately allocated to tenants that receive no benefit from them (e.g., allocating NNS BOS costs to NAS tenants);

(3) NNB should retain its BASID because it funds some common services such as the fire protection services and common perimeter security;

(4) There are 269 command UICs listed within the NNB BASID, but at least one major command is missing. Norfolk Naval Supply Center (NNSC)<sup>38</sup> is physically located at NNS and NAS and is within the NNB jurisdiction. NNSC should receive a NNB BOS allocation, yet it will not unless it is loaded into the BASID file. The underlying problem probably results from the program not recognizing matrix-like relationships discussed in section C.1, C.2.a. No further work was done with Norfolk data.

## **J. SAN DIEGO NAVAL STATION**

### **1. TENANTS AND EMPLOYEES**

The San Diego Naval Station (SDNS) (BASID 02006004, UIC 00245) has 66 different commands attached to its BASID. A 4 December 1990 letter from SDNS provides BOS data requested by NAVCOMPT for the DMDC database. In that letter, SDNS personnel reported that they provided support to 49 tenants and 74 ships homeported at the San Diego Naval Station. Data collected indicated there are 51 commands supported. Of these, 38 occupy building space for which SDNS is responsible.

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<sup>38</sup>NNSC is one of the largest commands at NNB in terms of square feet of building space occupied. NNSC "owns" its own buildings, and the host-tenant relationship between NNSC and the other commands changes depending on the command occupying the building under review.

The SDNS tenant list was compared to the DMDC BASID report. Twenty-six tenants SDNS claims they support were missing from the DMDC report. (Among those missing was NSC San Diego, as discussed in paragraph C.2.a.) However, the DMDC report contained a number of commands not listed on the SDNS tenant list. The personnel associated with the additional and missing commands resulted in a net difference of 677 personnel. SDNS reported 9922 and DMDC reported 10599.

One possible explanation for the discrepancies is that the Navy may assign multiple UICs to the same command to capture different activities at that command. This assignment method may not have been accounted for in the DMDC programming effort. This comment is supported by the DMDC report which contains many training commands, each assigned a small number of personnel, which the SDNS data does not indicate. Instead, SDNS reports the Fleet Training Center (UIC 61690) with a large population. Appendix D, compares the two reports. The forty-one UICs listed on the DMDC report but not on the SDNS report are not shown.

## 2. FINANCIAL DIFFERENCES

SDNS had a FY 1990 budget of \$32.1 million, yet the DMDC BASOPS report shows a total of \$87.6 million for SDNS BASE OPERATIONS. The 4 December 1990 SDNS letter indicated that SDNS spent \$11.1 million in BOS costs during FY 1990 and an additional \$7.4 million for Maintenance of Real Property (MRP). This leaves a \$69.1 million difference between the DMDC BASOPS report and the data in the 4 December 1990 SDNS letter.

\$30.9 million of the \$69.1 million difference is attributable to the cost of military personnel which SDNS did not pay but should be reflected in UMR data. A review of the remaining costs did not conclusively resolve the \$38.2 million discrepancy. A part of the problem may lie in the areas of Public Works Center provided support. A total \$28.1 million is reported in this area. The large magnitude of the Public Works related numbers makes them suspicious. Furthermore, the Public Works Center at San Diego Naval Station is a tenant, not a part of the SDNS command, but is reported on the SDNS BASID report. It is possible that the Public Works Center costs were commingled with SDNS costs in the automated data collection function.

If this is true, allocating the costs as the DMDC BASE OPS report shows is inappropriate. Services from the Public Work Centers are provided as requested by individual commands, presumably on a reimbursable basis. Those costs should be included against the mission of the requestor. Including Public Works costs as part of the allocable BOS costs misaligns costs and users. It spreads costs to other activities who have not benefitted. Nonetheless, these costs were left in for the example allocation.

Another item of concern is \$9.4 million of BOS costs attributable to the Navy Drug and Alcohol Program Management. The CAC for the item in question is 998K, defined as "Alcohol Abuse Education, NASAP." It is believed that this cost should not be reported as a BOS cost. It may have been included because it is considered a personnel support cost, which are defined in the UNIT COST RESOURCING GUIDANCE as BOS costs. However, this activity more closely resembles a training or medical activity, and could possibly stand alone as an activity for unit cost.

The last observation is that \$2.9 million was reported under CAC 6615. This CAC is not defined in the most recent change to the NAVCOMPT manual Volume II, (dated 22 October 1991). The 66\*\* series is related to transportation equipment rental, operation, and maintenance. It is possible that this code existed earlier in FY 1990 but has been deleted.

### **3. EXAMPLE ALLOCATION**

The results of the example allocation are found in Appendix D. The method used was to compare the DMDC-provided data to the data collected at SDNS. The remainder of this section describes the development and rational for the example allocation.

#### *a. Employees*

Personnel numbers assigned to activities were based on DMDC data and SDNS data were developed and provided for comparison purposes. As previously noted, there are inconsistencies between the DMDC data and the SDNS data. However, the graph in Appendix D, shows a generally positive correlation between the DMDC data and the SDNS data. The personnel data is reflected in Appendix D by showing the percent of personnel in each activity relative to the whole installation. Calculating the allocation expected by using the "OSD-method" was based on these percentages.

#### *b. Dollars*

The dollars amounts used to accomplish the allocation were based on the DMDC report. The example data omitted the \$30.9 million of military personnel

(salaries, etc.) and the \$9.4 million for the Drug and Alcohol Abuse treatment program. The total allocated amount was \$56.6 million.

*c. Costs*

Costs were categorized by referring to the NAVCOMPT manual and identifying the CACs in the DMDC report. For simplicity, and to match the data available, total BOS costs were grouped into five broad categories. These categories are:

- (1) Command, Administration and Service Support (Command);
- (2) Personnel Administration (Personnel);
- (3) Rental and Other Transportation Costs and Vehicle Maintenance and Operations, (Transport);
- (4) Minor Construction, Real Property & Facility Maintenance and Operations, (Real Property);
- (5) Security and Related Costs (Security).

*d. Basis*

The example allocation was developed using two basis: (1) personnel assigned to UICs; and, (2) building space occupied expressed in square feet. These basis were used because they appear to drive many of the BOS costs. However, some of the costs are clearly driven by a combination of space and personnel. In addition, there were some cases where an activity has an imbalance between space and personnel. For this reason, a third basis, based on both space and personnel was developed. The third basis, called "PEOPLE SQ-FT" in the Appendix D tables, combines space and personnel by

multiplying the base wide average of square feet per person by the number of personnel assigned to the activity and adding to it the number of square feet the activity occupies. In a simplistic manner, allocations made on the basis of this calculation accounts for the personnel-space imbalance. These three basis were selectively applied to the cost categories as follows:

**COST CATEGORY BASIS FOR ALLOCATION**

Command	Person-Sq Ft
Personnel	Number of Personnel
Transport	Number of Personnel
Real Property	Sq Ft
Security	Number of Person-Sq Ft

The three bases do not represent sophisticated cost accounting methods. However, it seems intuitive that there is some causal relationship between the cost categories and the basis selected for allocating each cost category. As indicated, calculating expected data from the "OSD-method" was done strictly on the number of personnel assigned to each activity as a percentage of the base population.

*e. Interpreting The Results*

If the cost data is allocated on basis that includes other than personnel, it reduces the correlation between personnel and the allocated costs. If it is assumed that the additional basis used for allocating costs more closely reflects the cost driver, then the resulting allocations may contain less distortion than the OSD-selected method. However, there is insufficient data to definitively make this statement. What is clear, and the main point of this exercise, is that allocating the BOS costs using more than one basis makes a difference. The difference is improvement if important causal relationships

have been included in the allocation. The issue then becomes, what is the value of improving the accuracy of the allocation method to reduce data distortion.

## **K. NAVAL SUPPLY CENTER SAN DIEGO**

### **1. TENANTS AND PERSONNEL**

The DMDC BASEOP file for the Naval Supply Center San Diego (SDNSC) displays 36 UICs assigned to BASID 02006005 and assigns a total of 4,826 personnel to this installation. SDNSC provided documents reflecting that they support nineteen resident tenants and provide support to sixteen non-resident commands. According to SDNSC records, there are a total of 1,448 personnel assigned to the tenant commands at the SDNSC compound.

This significant difference is probably a result of commands attached to the SDNSC BASID having employees at remote locations. Appendix E summarizes the personnel assignments by command. A graph is provided which visually highlights the differences. Like the SDNS graph, this shows a generally positive correlation between the DMDC report and the local data. Missing commands are not indicated.

The DMDC report also listed seventeen commands that have no apparent relationship to SDNSC. These commands are neither located at the NSC compound nor receive tenant type services from SDNSC. Additionally, there were five commands missing from the DMDC report which SDNSC claims they support (indicated by "0"

under the caption "DMDC PEOPLE"). However, these five commands only accounted for a total of 77 personnel according to SDNSC records.

## 2. ALLOCATION

Reviewing the DMDC reports for the BOS costs incurred by activities linked to BASID 02006005 indicated it is inappropriate to allocate the BOS costs incurred for this BASID *only* to activities assigned to this BASID. The BOS costs incurred by the commands attached to the SDNSC BASID provide common service benefit all nearly commands in the San Diego area. These costs provided services such as: fire protection, communications, disbursing, and personnel support services. Since SDNSC is a supply activity, (even though it is the host), the DMDC CAC mapping for supply activities does not separately report BASE OPS costs. SDNSC BOS costs are allocated to supply activity outputs. The commands linked to the SDNSC BASID and their reported BOS costs are:

<u>Command</u>	<u>Amount of BOS (\$ in millions)</u>
Commander, Naval Base San Diego	\$28.9
Fleet Accounting and Disbursing Center	48.6
Office of Civilian Personnel Management	2.3
Personnel Support Activity	10.3
Naval Communications Station	<u>16.7</u>
Total BASID 02006005 BOS costs	\$106.8

This installation provides an example of both types of "free riding" discussed in section C.2.b. These were: (1) host supply activity tenants incur a free ride because the depots and ICPs charge their BOS type costs to their outputs rather than allocate it to their tenants; and, (2) all the BOS costs associated with the BASID are allocated only to

those activities or functions assigned to the BASID, which allows the majority of those who benefit to receive the services for no cost (such as communications, personnel, etc.). This approach especially burdens the supply activities, since they allocate all their BOS cost to their output and receive a disproportionate share of other BOS costs.

## **L. NAVY SHIPS PARTS CONTROL CENTER**

The Navy Ships Parts Control Center (SPCC) list of tenants is consistent with the DMDC BASID report with two exceptions. The DMDC BASID report does not list as a tenant, the Defense Depot Region East (DDRE), a Defense Logistics Agency supply depot. DDRE was formed by consolidating several depots, including the Defense Depot Mechanicsburg (DDM) located at Mechanicsburg, Pennsylvania, within the SPCC compound.

According to SPCC records, DDRE warehouse operations account for 1,130 or 17% of the 6,548 personnel assigned to commands within the SPCC compound. Additionally, DDRE utilizes 1.8 million square feet of outdoor space, accounts for 26 percent of the administrative spaces and 28 percent of the covered warehouse space. These numbers could alter a BOS allocation if they were included in the SPCC BASID.

The DMDC BASID report does reflect the now non-existent DDM organization (UIC 31093) to which one person is shown as assigned. Additionally, there is an activity with no name and the UIC "DDMP" which reflects 42 personnel assigned.

The BASID report also omits the Defense Reutilization and Marketing Office (DRMO) as a tenant. The DRMO activity occupies 4,000 square feet of administrative space and reports 23 personnel assigned.

The reason DDRE and DRMO are not listed on the BASID report is because they may be reflected on another BASID report. Since the UICs seem to be listed only once, it is understandable why they are missing from the SPCC BASID report. The other items are probably "stray" data that require maintenance.

## M. OAKLAND NAVAL SUPPLY CENTER

The BASEOPS report for Oakland Naval Supply Center (NSCO) displayed 41 different UICs, of which 27 are related to recruiting offices located on the west coast and Hawaii. It could not be determined why these UICs were assigned to the NSCO BASID.

NSCO actively supports 32 tenants which reside at the NSCO compound and a number of others who reside "off base." Only thirteen of the tenants are listed on the DMDC report. As with the SPCC report, none of the DLA activities were listed. The DLA activities occupy 15 percent of the office space and 75 percent of the warehouse and storage space.

## N. CHAPTER SUMMARY

This chapter reviewed the OSD-directed method for allocating Base Operations Support costs. The method uses personnel assigned to installations by activity as the basis for allocating BOS costs.

A key issue identified was that the DMDC program establishes unique relationships between installations and commands. Installations are assigned an identifier called the "BASID" which is linked with command UICs. UICs seem to be assigned to only one BASID. This feature prevents the program from making allocations which could minimize the data distortion for unit cost purposes. Several specific data issues were identified that may impact data quality and the BOS cost allocations. These include possible erroneous data entries and questionable BASID-UIC assignments. DMDC should consider examining these areas.

For NAVSUP activities, it was noted that because of the NAVSUP/DMDC agreement on which CACs should be allocated to depot or ICP output, depots and ICPs do not reflect BOS costs that could be allocated to tenant activities. NAVSUP should consider reviewing BOS costs at installations where a supply activity is the host. This review should determine whether BOS costs should be allocated to tenants. Alternatively, NAVSUP should investigate the possibility of capturing some of the host costs on the ISAs. ISAs reimbursement can help legitimately reduce the need to recover host service costs when such costs are unrelated to the output.

Lastly, the chapter presented an example alternate allocation method. The example was developed to illustrate differences obtained between an alternate allocation method and the OSD-selected method. The method is not suggested as an alternative to the OSD-method. The method does suggest pursuing additional study to determine an allocation method that would provide less distorted data. One method that would be appropriate is an activity-based allocation system. This method correlated activity

directly with cost and as such, is a direct allocation method that will distort data less than the indirect method presented here.

Before initiating studies into an improved alternate allocation methods, the issue of cost tradeoffs should be addressed. As noted earlier the increase in data accuracy carries a higher cost than the present allocation system. To a large extent, the unit cost concept success is based on whether managers believe that the system is providing useful information to users. If G&A, and especially BOS costs, constitute a significant portion of the unit cost goal, then it is important that such cost allocations be reasonably and accurately allocated. In this way managers will understand they are being held responsible for costs which they can exert some control or management.

## VIII. SUMMARY, CONCLUSIONS AND FUTURE RESEARCH

### A. SUMMARY

Chapter I provided a discussion of the background and changing environment which has caused the DoD budget to dramatically decline. The concept of unit cost resourcing as an evolution of the management was presented.

Chapter II traced the history of the defense resource and allocation system, highlighting important milestones since 1921. The chapter emphasized that the unit cost concept is not totally new. Its origins can be found as early as 1932. However, unit cost as a DoD-wide management system is new. Lastly, the chapter focused on recent history which gave rise to the introduction of the OSD unit cost initiative.

Chapter III presented the unit cost conceptual framework and how the unit cost concept can be implemented. An important part of implementing the unit cost concept was the Defense Review Management Decision (DMRD) 971 which established the Defense Business Operations Fund (DBOF). The DBOF provides a mechanism for implementing the unit cost concept and is discussed at length.

Chapter IV discussed the unit cost implementation effort in the Navy and provided a wide range of management comments reflecting the views of a variety of users. Specifically addressed is implementation in the supply and medical functions. The recruiting function is briefly addressed.

Chapter V presented an economic analysis of the unit cost within a microeconomic

framework. The chapter addressed the application of microeconomic principles to three broad unit cost objectives. The objectives are assessed from the microeconomic viewpoint as to whether the unit cost concept objectives will be achieved.

In Chapter VI, the issue of Base Operations Support (BOS) cost allocations is discussed. The focus of this chapter was the presentation of distortions that result from indirect allocation methods and the current business thinking on overcoming these distortions. The chapter provided a simplified description of the OSD-selected BOS cost allocation method.

Chapter VII discussed the DMDC-developed unit cost programs which allocated the BOS costs and analyzed data collected from field activities. An alternate allocation scheme is developed and compared to illustrative allocations obtained with the OSD-selected allocation method.

## **B. GENERAL CONCLUSIONS**

The need to change the basic way DoD does business is motivated by the decreasing resource environment and the need to gain control over the costs of the Department operations and support functions. OSD leaders and others believe that the solution to DoD efficiency problems is to encourage a more business-like environment within DoD. The OSD leadership claims the unit cost resourcing system achieves this objective. What is most significant about the unit cost concept is that it is a ubiquitous DoD-wide effort to improve resource management. While some critics may balk at the

concept, it is likely that any attempt at improving DoD resource management is better than none. To this end, the advantages and limitations of the unit cost concept should be recognized.

Among the advantages, the unit cost concept:

- (1) Communicates more information to users (producers and consumers) about costs;
- (2) Attempts to focus management attention on the relationship between cost and output and avoid the "use it or lose it mentality" at support production activities;
- (3) Makes DoD activity funding fluid with demand;
- (4) Strives to improve decision making at all levels;
- (5) Holds managers accountable for their decisions by providing a set earning rate;

In its current form, some major limitations exist in the unit cost concept that in many cases are the basis of management objection. The unit cost concept:

- (1) Treats all costs as variable costs;
- (2) Relies on non-standard accounting systems and data sources in which the data validity (cost accounting information) is questionable and therefore may provide questionable unit cost goal information;
- (3) Recognizes a limited number of outputs;
- (4) Indirectly allocates G&A costs on a single basis with a high degree of data aggregation which likely introduces significant distortion;
- (5) Considers only the average total cost and not the marginal cost of output;

(6) Over constrains managers by: (a) setting output price; (b) requiring organizations satisfy all levels of demand at the unit cost price; (c) requiring managers to breakeven; (d) allocating costs to functions that may be unrelated to the function; and, (e) potentially evaluating managers using unit cost goals attainment as a performance measure. These constraints could provide incentives for managers to cut quality which may go undetected in the short run and have serious long term consequences.

## C. IMPLEMENTATION

Overall, the Navy has not strongly supported the unit cost implementation effort. Navy officials have provided little guidance to implement the unit cost concept into a workable system satisfactory to Navy financial officials. Instead, Navy actions indicate that some senior officials believe unit cost is a low priority subject. Given this, and the lack of Navy guidance on unit cost, it is not surprising to find confusion and uncertainty regarding installation of the unit cost system within the Department of the Navy.

However, Navy officials should not solely shoulder the blame for poor Navy support. The OSD method of managing the unit cost implementation may not have been optimal. Forming task forces that are expected to resolve massive organizational, procedural, accounting or other problems in a short period is problematic at best. The issues associated with the unit cost concept require careful, considered and deliberative

management solutions. Superficially, unit cost represent a new procedure or accounting system. In reality, the unit cost concept is an entirely new management philosophy which runs counter to deeply embedded cultural norms.

Regardless of how high a priority Navy officials place on the unit cost implementation, it is clear that the unit cost concept will be implemented at the component level. Therefore, it would appear advantageous for the Navy to consider a more active role in transforming the unit cost system into a useful managerial tool.

Functional commanders (e.g., NAVSUP, BUMED) need to coordinate with command level activities to determine the exact data/information local managers need in order to manage against work load goals. All managers must realize that their future resources will be a product of the unit cost system. Managers should focus on maximizing command efficiency but must also understand the unit cost concept and how it effects their operations. Managers should become familiar with how unit cost may distort data and strive to implement command level unit cost systems that will enable them to make good decisions consistent with efficiency improvement and quality maintenance.

There may be some functions that OSD should review in the near future to determine if the unit cost effort will provide a sufficient cost effective benefit. For example, the Navy recruiting area was briefly examined. This area constitutes a relatively small portion of the Navy budget. Given the function, cost structure, and nature of the costs in this area it is unclear if the unit cost concept will provide a cost effective management method.

#### D. ECONOMIC ANALYSIS

The economic analysis indicates that using unit cost information focuses management attention on the average total cost of production, and not the marginal costs. This focus can provide misleading information possibly resulting in "poor" decisions. The Office of Management and Budget, Circular A-11 indicates that fixed costs and variable costs be differentiated to develop the marginal cost. OSD should seriously consider some method to incorporate the calculation of marginal cost data. Although this suggestion constitutes a considerable undertaking, the benefits could be significant.

If defense producers are assumed to be more business-like, and to become competitive firms, then producers are compelled to become more efficient in order to achieve profit or gain sharing. Additionally, consumers will reduce consumption because producers have incentive to eliminate free riding and prices to consumers will increase. These points serve to support the logic of the unit cost concept.

A personnel evaluation system tied to attaining unit cost goals as the concept is currently being implemented may provide the incentives to managers to "game" the unit cost system. This measure could possibly result in lower quality output or defeat the purpose of the system.

## E. BOS COST ALLOCATION

The BOS allocation problem is of significant concern. Almost \$26.5 billion dollars was spent on BOS costs in FY 1990. This amount represents a significant portion of the DoD budget. For simplicity, data availability and because "personnel" are a common denominator among commands, "personnel" was chosen as the sole allocation basis. The OSD guidance indicates that there may be better ways to allocate G&A and BOS costs. However, the UNIT COST RESOURCING GUIDANCE places the burden on the components to determine alternate methods, subject to OSD approval.

The data analyzed indicated that developing alternative allocation methods could tend to reduce data distortions. Using distorted data would appear to run counter to the objective of increasing cost awareness. The question is, "What good is increased cost awareness if the costs are wrong?" Considering this is important because if unit cost information is to be the basis by which manager make decisions, then they should be provided accurate data. However, it must be realized that data accuracy has a price, and there is no clear indication what the acceptable level of accuracy should be for different echelons of management.

A review of the field data and DMDC reports indicated that significant data distortion occurs as a result of the host-tenant relationships DMDC has programmed for the Navy allocation part of the unit cost system. Specifically, many instances were observed in which the activities that incurred the costs were not related to the activities receiving the benefit. This is may be the result from the calibre of support provided to DMDC when they were initially programming the Navy host-tenant relationships.

Another example of this problem was observed at supply activities that do not allocate BOS costs. This is a result of the Cost Account Code (CAC) mapping agreement between DMDC and NAVSUP. DMDC should consider reviewing Navy installation host-tenant relationships to improve the allocation with Navy support. Additionally, NAVSUP should consider reviewing the current structure and decide if it is appropriate for their host activities to allocate BOS costs to tenants. If so, a new CAC mapping needs to be determined.

Lastly, it was noted that the current accounting system does not provide sufficient information for the DMDC computer program to properly handle reimbursable funding. Unfortunately, the resolution to this problem will likely need to wait for the new accounting system. However, this point raises the issue of whether activities should negotiate Inter-service Support Agreements (ISAs). In doing so it appears as though some tenants may be subsidizing others. An alternative supported by this paper is for a host to establish ISAs with all tenants and to request DMDC exclude them from automatic BOS allocation. This would minimize the distortion introduced by the current allocation method.

## **F. AREAS FOR FUTURE RESEARCH**

The unit cost concept provides a rich topic for future research. This section provides areas that should be considered for future research. They are discussed in the order the thesis was organized.

## 1. UNIT COST IMPLEMENTATION

(1) Implementation Strategy Comparison Study. The objective of this research would be to determine if there are useful strategies the other components have used in implementing the unit cost concept that the Navy could adopt. It was mentioned during interviews conducted for this thesis that the Air Force and particularly the Army have applied significant resources in implementing the unit cost concept. As evidence, the Army produced the only known training aid regarding the unit cost concept.

(2) Implementation and Effectiveness Follow-Up Study. This study could be designed to assess the Navy and overall DoD implementation progress. One focus for this research could be to measure management attitudes towards the unit cost concept. If possible, this effort should be done before the accounting system is in place, and then a similar study after implementation. Comparing the results could provide information on the effectiveness of the unit cost concept as a resource allocation system and determine if the unit cost concept is achieving the stated goals.

(3) Other Functional Areas Study. This thesis discussed supply, medical, and recruiting functions. Unit cost will be implemented in many others as experience is gained and accounting systems are developed. Research in these other areas to identify problems and potential solutions would be useful.

(4) Organizational Change Study. This study could examine an organization that has implemented the unit cost concept and identify if the organization has become more efficient, decreased costs and provides the same or better service before the unit

cost concept were implemented. In addition, organizational or management changes could be identified that occurred as a result of operating under the unit cost system.

## 2. ECONOMIC ANALYSIS

(1) Economic Efficiency Analysis Study. Using actual costs, a study could be conducted to measure economic efficiency at an organization operating under unit cost concept. This could be contrasted with the technical efficiency to determine overall improvement and to identify if using marginal cost information would have changed management decisions.

(2) A General Equilibrium Analysis Study. One area this thesis did not address was the concept of equilibrium under the unit cost concept. This study could address if it is even possible for DoD to attain an equilibrium state (i.e., were supply equals demand).

(3) Consumer Behavior and DoD Savings Study. The question is whether the changes to the budgeting system and price changes have sufficiently changed consumer habits. Can consumers obtain what they need, but in smaller quantities thus promoting DoD savings?

## 3. BOS ALLOCATION METHODS

(1) Information Distortion Study. This thesis highlighted that unit cost information is distorted. A detailed study of data aggregation and allocation could identify the specific information distortions introduced by the unit cost system. This

could provide valuable new information so that managers can consider the effects of distortions when making decisions.

(2) Cost-Benefit Study. There is no question that BOS costs can be more accurately allocated across missions or users in an effort to reduce distortion. However, costs increase with accuracy. This research could analyze the cost-benefits of increased accuracy and recommend which areas would benefit in the most cost effective manner. Also it is unlikely that one allocation scheme would be appropriate for all activities. Therefore, the study could suggest if the optimal allocation strategy is to "tailor" a scheme for each installation, or to design an improved standardized allocation scheme.

(3) Allocation Methods Study. This thesis provided an example alternative allocation method based on a relatively small data base. Further study could determine an appropriate method for allocating BOS costs. Alternatively, it may be appropriate to "tailor" an allocation scheme on an installation by installation basis.

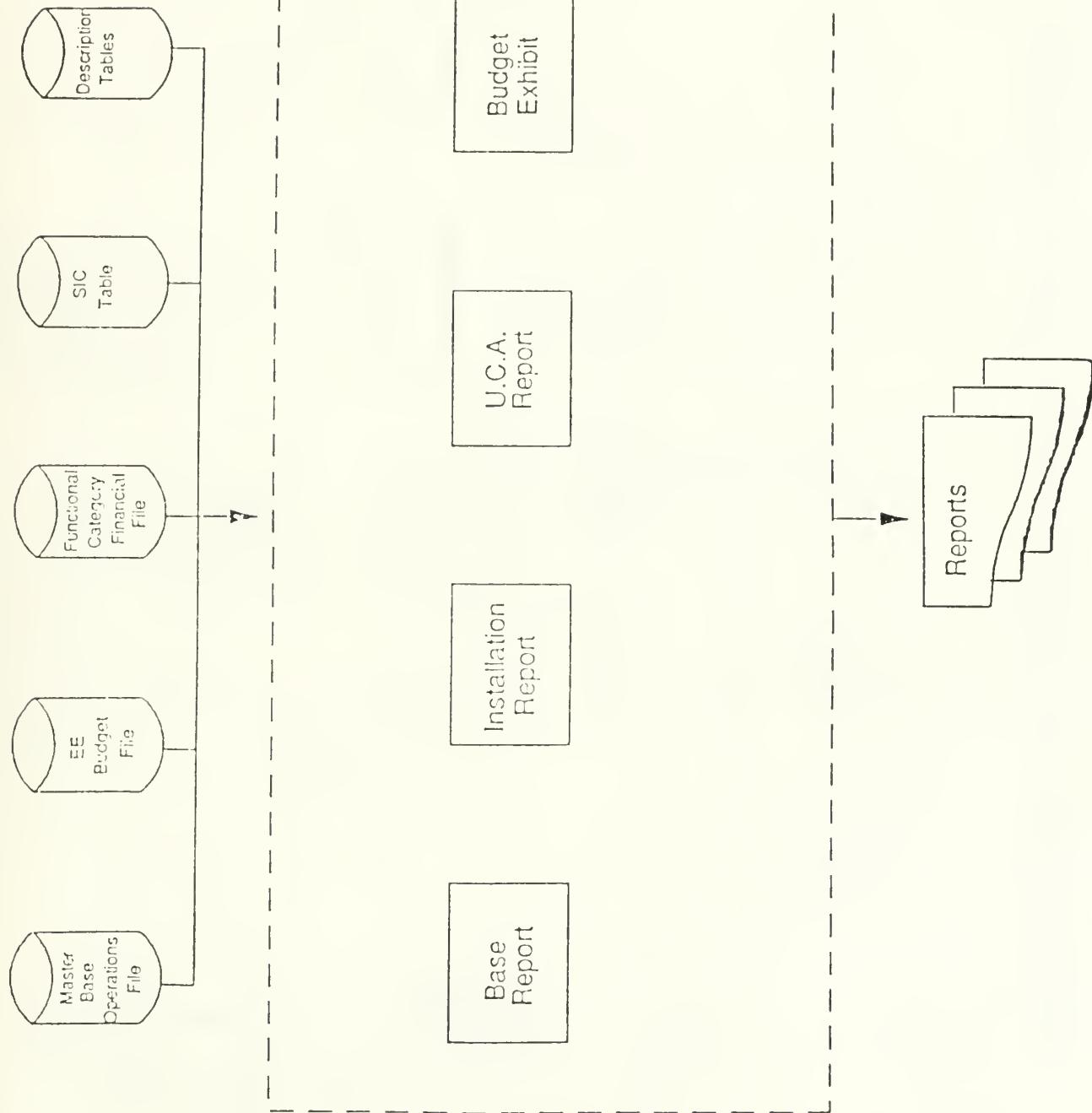
## APPENDIX A

### **THE UNIT COST SYSTEM DESIGN**

This Appendix provides a graphic presentation of the unit cost system design, allocation process and report generation. The graphic was provided by the Defense Manpower Data Center, Monterey, California.

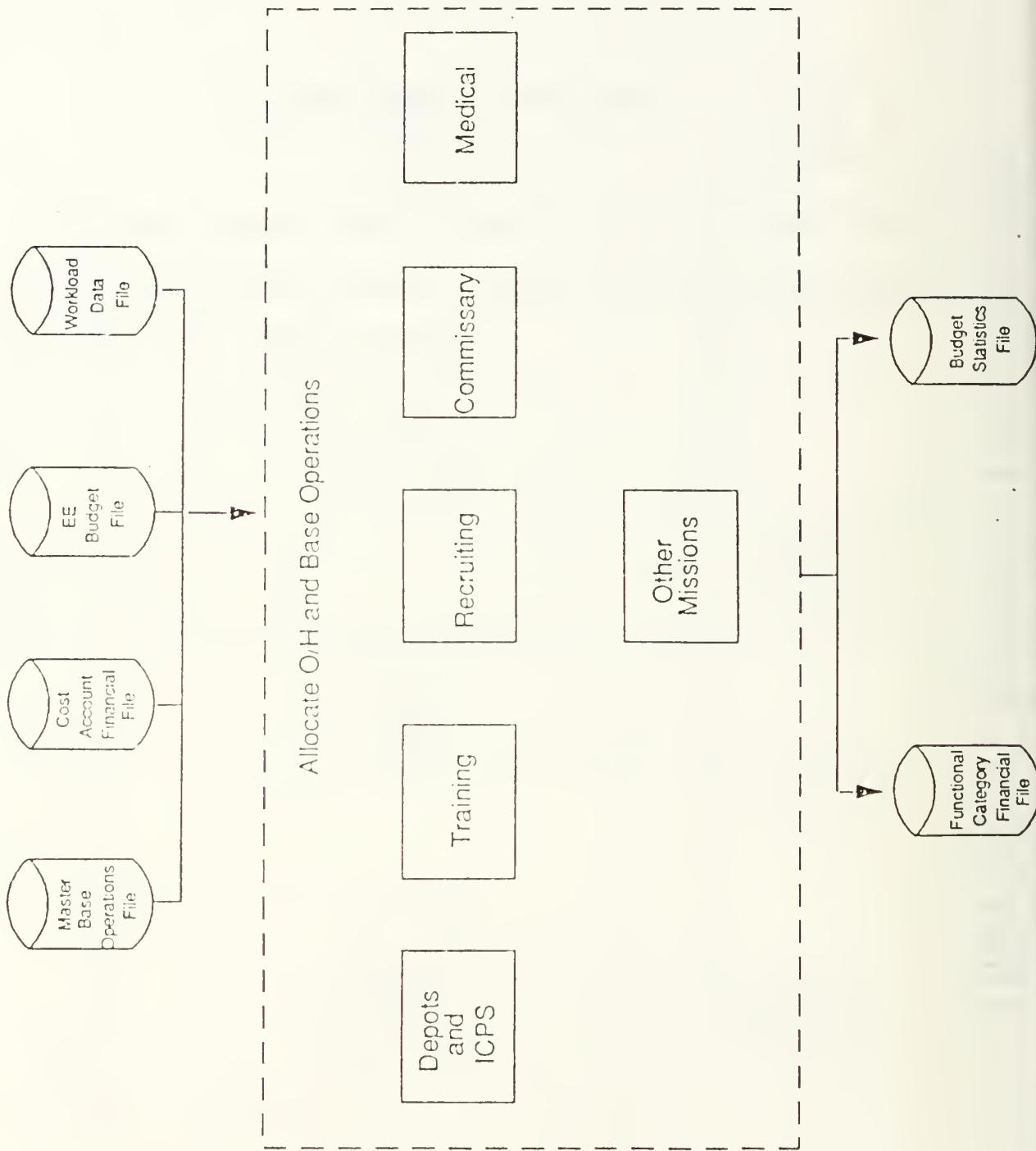
# UNIT COST REPORT PROCESSING

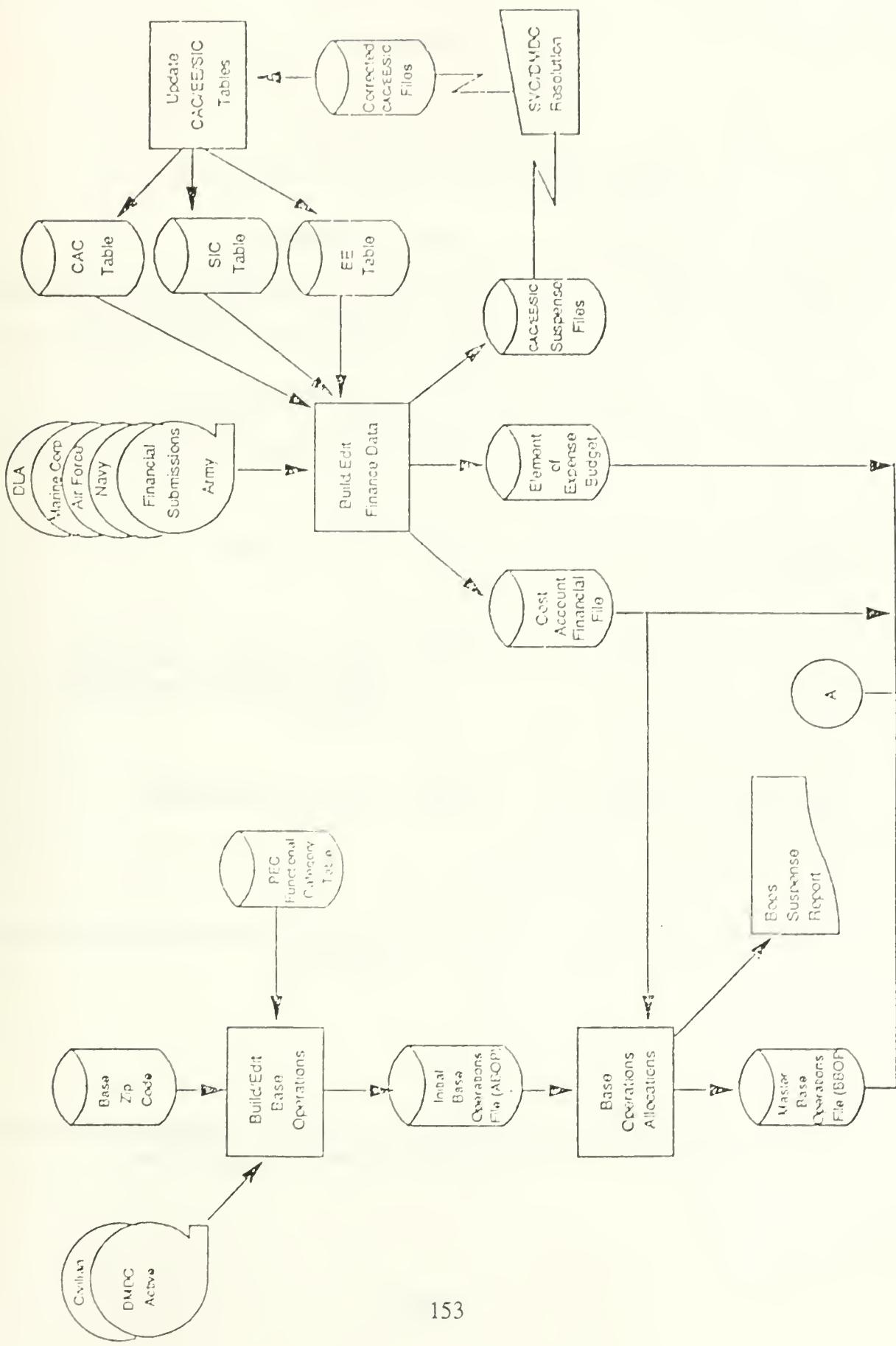
16 May 1991



## UNIT COST ALLOCATION PROCESSING

16 May 1991





## APPENDIX B

### ACTIVITIES VISITED

<u>ACTIVITY/LOCATION</u>	<u>TYPE</u>	<u>COMMENTS</u>
Norfolk Naval Base VA	Host	Provides host services to many Norfolk, commands. At DMDC request.
Navy Ships Parts Control Center Mechanicsburg, PA	ICP	Close to Washington, D.C.
Oaknoll Naval Hospital <sup>1</sup> Oakland, CA	MTF	Close to Monterey.
Oakland Naval Supply Center Oakland, CA	Depot	Close to Monterey. Consolidated Tracey Army Depot, no physical distribution.
San Diego Naval Supply Center San Diego, CA	Depot	Has physical distribution.
San Diego Naval Station CA	Host	Provides host services to many San Diego, commands.

<sup>1</sup>Data from this location is not specifically discussed, but information obtained was included in the discussion on implementing unit cost in the medical area.

## APPENDIX C

### Navy Inventory Control Point and Depot Mapping

This Appendix provides the "mapping" of Navy Cost Account Costs to Unit Cost Function for Inventory Control Points (ICPs) and Navy Supply Centers (depots) agreed to by the Naval Supply Systems Command, Washington, D.C. and the Defense Manpower Data Center, Monterey, California.

# NAVY ICP MAPPING

As of 25 Oct 91  
(Used for New Design Reporting  
For Periods July, August, and September)

ALL OPERATIONS ARE STOCK FUND

<u>FUNCTIONS</u>	<u>COST ACCOUNT CODES/SOURCE</u>
<b>ICP OPERATIONS</b>	
Inventory Control Point	2151*, 252*, 253*, 254*, 255*, 259*
Materiel	Manual
Credit Returns	Manual
Central Desing Activity	50% of UIC 00367 (FMSO)
Reimbursement to Depots	Depot Workload @ \$25/line
Quality Engineering	26**, 290B
Large Purchase	271A, 271C, 217E, 271G, 271I, 273A
Small Purchase	271B, 271D, 271F, 271H, 271J, 274B
Materiel Accounting	1C4A, 1C4B, 1C4F, 1C4K, 1C4L
Nuclear Support	290N
Prov/Spec Projects	290P
SSSD Support	290S
Init/Follow-on Prov	241A, 241D
Program Requirements	241B, 241E
Allowance Prod Purchases	241C, 241F, 242F, 243A
ICP OPERATIONS/UNIT COST	
<b>OTHER ICP OUTPUTS</b>	
Contract Management Review	28**
Conventional Ammo	290C
Hazardous Waste	212L
Personal Property	231C
Physical Distribution	211*, 212* except 212L, 214C, 217C
Lumber/Timber	231E

## NAVY ICP MAPPING

As of 25 Oct 91

<u>FUNCTIONS</u>	<u>COST ACCOUNT CODES/SOURCE</u>
<b>INDIRECT</b>	
Resystemization	290R
Files Accuracy/Maint	256*
Tech Support	257*
Weapon Systems Support	258*
Technical Admin Support	232A
Systems Support	232B
ICP Analysis	232C
IRAM	232D
Project Management-Other	29** not otherwise specified, except 290D which should be unassigned
<b>GENERAL &amp; ADMINISTRATIVE</b>	
Command & Admin	1A**
Resource Management	1C1*, 1C4X
Civilian Payroll	1C4D, 1C4P
Disbursing	1C4E, 1C4H, 1C4N
Fund Resources Accounting	1C4C, 1C4M
Training	1D6A, 1D6D, 5***
ADP	1H**
Admin Support Services	1J**
Statistical Accounts	1R**
Undistributed	1***
Fuel Operations	231A
Transportation	6***
MRP/Minor Construction	7***
Utilities	8***
Housekeeping	9***
<b>NON-ADDS</b>	
	1X**
	LAIJ
	XXXX

## NAVY DEPOT MAPPING

As of 25 Oct 91  
 (Used for New Design Reporting  
 For Periods July, August, and September)

ALL OPERATIONS ARE STOCK FUND

<u>FUNCTIONS</u>	<u>COST ACCOUNT CODES/SOURCE</u>
<b>DEPOT OPERATIONS</b>	
Receipts	212B
Issues	212C, 212D, 212J
2nd Destination Transportation	Manual
Central Desing Activity	50% of UIC 00367 (FMSO on ICP File)
Shipping/local Delivery	212E
<b>TOTAL DEPOT OPERATIONS/UNIT COST</b>	
<b>OTHER DEPOT OUTPUTS</b>	
Supply Departments at Shipyards	Manual \$2.5M
FOSSAC	All UIC 65966
NPFC	All UIC 00288 (On ICP File)
Centrally Managed Programs	Manual BUCON
ATAC HUB	221A, 221B
Fuel Operations	231A, 232A
Contract Management Review	28**
Procure-Large Purchase	271A, 271C, 271E, 271G, 271I, 2700, 2710
Procure-Small Purchase	271B, 271D, 271F, 271H, 271J
Personal Property	231C, 232C
SERVMART	231M, 232M
Service Craft	1JIC
Terminal Operations	231D
Port Services	231B
Material Accounting	1C4A, 1C4B, 1C4K, 1C4L
Hazardous Material	6E**
Project Management	231E, 290M, 290N, 290S

## NAVY DEPOT MAPPING

As of 25 Oct 91

<u>FUNCTIONS</u>	<u>COST ACCOUNT CODES/SOURCE</u>
<b>INDIRECT</b>	
Stock Control Overhead	211A
Inventory Control	211B
Technical	211C
Stock Pt. Planning	211D
Outfitting	211E
Training	211F
Warehousing Overhead	212A
Physical Inventory	212F
Reparables Management	212G
Storage	212H
Non-HUB Processing	212K
Hazardous Waste	212L
Special Weapons	212M
Training - Physical Dist	212N
Rewarehousing	2132
Miscellaneous	21Y0, 2145, 232N, 257C, 2590
<b>GENERAL &amp; ADMINISTRATIVE</b>	
Command & Admin	1A**
Resource Management	1111, 1700, 1C4X, 290B, 290D
Civilian Payroll	1C1*, 1R**, 1X**
Disbursing	1C4D, 1C4P
Fund Resources Accounting	1C4E, 1C4F, 1C4H, 1C4N
Training	1C4C, 1C4M
ADP	1D6*
Admin Services	1H**
Transportation	1J** except 1J1C
Maint of Real Property	62**-69**, 6B00, 6B6F (Not 6E)
Utilities	7***
PWC Administration	8***
Housekeeping/other	91**
Other Engineering Support	92**
	93**, 99**
<b>NON-ADDS</b>	
Allocated Credit	**Z0    ** FOR ALL CAC SERIES **
Allocated Debit	**Z1    ** FOR ALL CAC SERIES **
Internal Use	AD6A
Internal Use	AR43
Internal Use	EH1A
Internal Use	LWOP
Internal Use	31JC

## APPENDIX D

### San Diego, Naval Station and the Example Alternative Allocation Method

This Appendix provides the data used to develop the example allocation method results. The data reflects information provided by the staff and Comptroller of San Diego Naval Station (SDNS) and reports provided by the Defense Manpower Data Center, Monterey, California. The data includes:

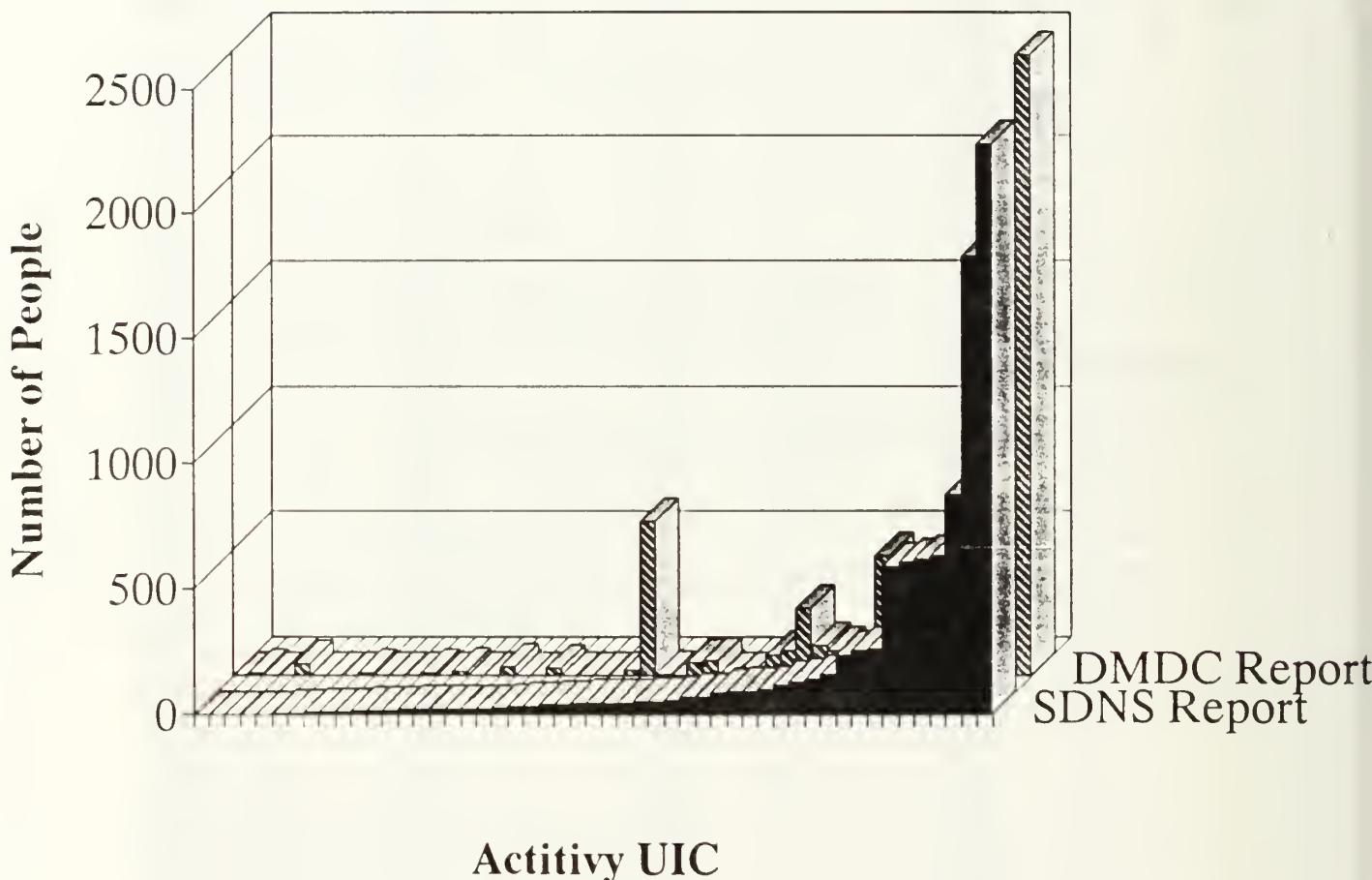
<u>Item</u>	<u>Description</u>
(1)	Naval Station, San Diego Summary Data
(2)	DMDC versus SDNS People Graph
(3)	Command, Personnel, and Transport Cost Categories grouped by CACs
(4)	Real Property and Security Cost Categories grouped by CACs
(5)	Allocation Using "People" Assigned
(6)	Alternate Allocation Basis (% by cost category) using DMDC "People" numbers
(7)	Alternate Allocation Basis (% by cost category) using SDNS "People" numbers
(8)	Allocated Cost (on alternate basis) using DMDC "People"
(9)	Allocated Cost (on alternate basis) using SDNS "People"

(1)	Naval Station, San Diego Summary Data
(2)	DMDC versus SDNS People Graph
(3)	Command, Personnel, and Transport Cost Categories grouped by CACs
(4)	Real Property and Security Cost Categories grouped by CACs
(5)	Allocation Using "People" Assigned
(6)	Alternate Allocation Basis (% by cost category) using DMDC "People" numbers
(7)	Alternate Allocation Basis (% by cost category) using SDNS "People" numbers
(8)	Allocated Cost (on alternate basis) using DMDC "People"
(9)	Allocated Cost (on alternate basis) using SDNS "People"

# Naval Station, San Diego (UIC N00245)

ACT NUM	UIC	TOTAL SQ FT	% OF TOT	RPTD PEOPLE	% OF TOT	DMDC PEOPLE	% OF TOT
1	00030	0	0.00%	11	0.11%	0	0.00%
2	00242	18388	0.40%	32	0.32%	0	0.00%
3	00244	282669	6.15%	258	2.60%	0	0.00%
4	00245	2481469	53.97%	874	8.81%	1469	13.86%
5	00247	190861	4.15%	627	6.32%	0	0.00%
6	00259	25920	0.56%	0	0.00%	0	0.00%
7	0025A	8696	0.19%	129	1.30%	100	0.94%
8	0546A	14301	0.31%	53	0.53%	51	0.48%
9	13871	800	0.02%	116	1.17%	119	1.12%
10	31557	13720	0.30%	0	0.00%	6	0.06%
11	35612	50551	1.10%	4	0.04%	0	0.00%
12	35720	0	0.00%	31	0.31%	29	0.27%
13	39049	5680	0.12%	18	0.18%	0	0.00%
14	39354	64416	1.40%	56	0.56%	54	0.51%
15	42980	0	0.00%	45	0.45%	18	0.17%
16	43435	0	0.00%	50	0.50%	0	0.00%
17	45020	50800	1.10%	100	1.01%	266	2.51%
18	46276	0	0.00%	39	0.39%	0	0.00%
19	52739	261	0.01%	0	0.00%	42	0.40%
20	53824	159443	3.47%	67	0.68%	0	0.00%
21	53997	18781	0.41%	21	0.21%	34	0.32%
22	55304	12508	0.27%	91	0.92%	79	0.75%
23	57049	0	0.00%	4	0.04%	0	0.00%
24	60681	9280	0.20%	0	0.00%	0	0.00%
25	61690	418958	9.11%	588	5.93%	71	0.67%
26	62706	35043	0.76%	70	0.71%	0	0.00%
27	62888	0	0.00%	46	0.46%	12	0.11%
28	62791	39419	0.86%	616	6.21%	614	5.79%
29	63015	17555	0.38%	9	0.09%	0	0.00%
30	63057	18972	0.41%	19	0.19%	0	0.00%
31	63387	17611	0.38%	2276	22.94%	2481	23.41%
32	63394	700	0.02%	0	0.00%	0	0.00%
33	65913	0	0.00%	36	0.36%	0	0.00%
34	65584	14915	0.32%	255	2.57%	0	0.00%
35	65918	10290	0.22%	1831	18.45%	1817	17.14%
36	66022	67126	1.46%	238	2.40%	474	4.47%
37	66105	331406	7.21%	605	6.10%	167	1.58%
38	66894	12960	0.28%	22	0.22%	0	0.00%
39	68132	12960	0.28%	17	0.17%	10	0.09%
40	68193	0	0.00%	45	0.45%	0	0.00%
41	68266	96490	2.10%	85	0.86%	0	0.00%
42	68335	0	0.00%	12	0.12%	0	0.00%
43	68370	45672	0.99%	94	0.95%	100	0.94%
44	68407	0	0.00%	10	0.10%	11	0.10%
45	68439	16016	0.35%	14	0.14%	0	0.00%
46	68482	0	0.00%	18	0.18%	17	0.16%
47	68553	448	0.01%	157	1.58%	0	0.00%
48	68562	25920	0.56%	142	1.43%	52	0.49%
49	68711	0	0.00%	20	0.20%	0	0.00%
50	70240	7220	0.16%	25	0.25%	0	0.00%
51	82630	0	0.00%	46	0.46%	5	0.05%
52	OTHUIC	0	0.00%	0	0.00%	2501	23.60%
	<b>TOTAL</b>	<b>4598225</b>	<b>100.00%</b>	<b>4922</b>	<b>100.00%</b>	<b>10599</b>	<b>100.00%</b>

## People Numbers DMDC versus SDNS Data



### Command, Admin and Service Support

CAC		DIRECT LABOR	DIRECT NONLAB	TOTAL
1A**	Com, PAO, Legal	\$552,236	\$455,324	\$1,007,560
1B10	Mgt Ops	156,722	5,998	162,720
1C**	Comptroller	1,266,674	63,358	1,330,032
1H**	ADP	397,858	1,012,983	1,410,841
1J**	Admin Office Ser	345,688	53,650	399,338
1R**	Misc	71,314	1,298	72,612
1X**	Ledger Accts	228,735	0	228,735
18**	Audio-Vis Support	0	18,952	18,952
6A**	Communications	0	1,273,689	1,273,689
<b>TOTAL</b>		<b>\$3,019,227</b>	<b>\$2,885,252</b>	<b>\$5,904,479</b>

### Personnel Administration

CAC		DIRECT LABOR	DIRECT NONLAB	TOTAL
1D**	Civ Manpwe Mgt	\$600,198	\$142,505	\$742,703
99**	Personnel Support	2,620,172	7,871,846	\$10,492,018
<b>TOTAL</b>		<b>\$3,220,370</b>	<b>\$8,014,351</b>	<b>\$11,234,721</b>

### Vehicles Maint, Ops and Rental and Other Transp

CAC	DESC	DIRECT LABOR	DIRECT NONLAB	TOTAL
62**	Maint of Trns Veh	\$0	\$174,048	\$174,048
64**	Other Veh Main	0	14,368	14,368
66**	Tran Eqip Rental	0	2,949,591	2,949,591
6810	Overhead Ops	0	3678	3,678
<b>TOTAL</b>		<b>\$0</b>	<b>\$3,138,007</b>	<b>\$3,138,007</b>

## Real Property & Facility Maint and Ops and Minor Con

CAC	DESC	DIRECT LABOR	DIRECT NONLAB	TOTAL
70**	Minor Con Costs	\$0	\$1,269,298	\$1,269,298
71**	Building Maint	0	9,255,656	9,255,656
72**	Waterfront Maint	0	2,370,296	2,370,296
7450	Grounds	0	6,712	6,712
75**	Other Structures	0	614,602	614,602
76**	Utility Plants	0	188,328	188,328
77**	Utiltiy Distribution	0	334,836	334,836
78**	Preventative Maint	0	903,462	903,462
8260	Steam and Water	0	1,879,326	1,879,326
83**	Electricity	0	3,096,352	3,096,352
85**	Sewage	0	638,870	638,870
87**	Other utilties	0	376,914	376,914
91**	Eng'ing and Admin	774,286	1,843,374	2,617,660
92**	Oth PW Shop Ops	0	5,291,849	5,291,849
9320	Rentals	0	74,758	74,758
<b>TOTAL</b>		<b>\$774,286</b>	<b>\$28,144,633</b>	<b>\$28,918,919</b>

## Security, Police, Traffic Controll and Related Costs

CAC	DESC	DIRECT LABOR	DIRECT NONLAB	TOTAL
6B10	Administration	\$0	\$31,552	\$31,552
6B20	Police and Guards	14,808	0	14,808
6B60	Police Protection	6,393,304	861,204	7,254,508
<b>TOTAL</b>		<b>\$6,408,112</b>	<b>\$892,756</b>	<b>\$7,300,868</b>

# Allocation Using "People" Assigned

ACTIVITY NUM	UIC	RPTD		TOT COST \$56,576,286	DMDC		TOT COST \$56,576,286
		PEOPLE	% OF TOT		PEOPLE	% OF TOT	
1	00030	11	0.11%	\$62,723	0	0.00%	\$0
2	00242	32	0.32%	182,467	0	0.00%	0
3	00244	258	2.60%	1,471,143	0	0.00%	0
4	00245	874	8.81%	4,983,640	1469	13.86%	7,841,359
5	00247	627	6.32%	3,575,220	0	0.00%	0
6	00259	0	0.00%	0	0	0.00%	0
7	0025A	129	1.30%	735,572	100	0.94%	533,789
8	0546A	53	0.53%	302,212	51	0.48%	272,232
9	13871	116	1.17%	661,444	119	1.12%	635,209
10	31557	0	0.00%	0	6	0.06%	32,027
11	35612	4	0.04%	22,808	0	0.00%	0
12	35720	31	0.31%	176,765	29	0.27%	154,799
13	39049	18	0.18%	102,638	0	0.00%	0
14	39354	56	0.56%	319,318	54	0.51%	288,246
15	42980	45	0.45%	256,595	18	0.17%	96,082
16	43435	50	0.50%	285,105	0	0.00%	0
17	45020	100	1.01%	570,211	266	2.51%	1,419,878
18	46276	39	0.39%	222,382	0	0.00%	0
19	52739	0	0.00%	0	42	0.40%	224,191
20	53824	67	0.68%	382,041	0	0.00%	0
21	53997	21	0.21%	119,744	34	0.32%	181,488
22	55304	91	0.92%	518,892	79	0.75%	421,693
23	57049	4	0.04%	22,808	0	0.00%	0
24	60681	0	0.00%	0	0	0.00%	0
25	61690	588	5.93%	3,352,838	71	0.67%	378,990
26	62706	70	0.71%	399,147	0	0.00%	0
27	62888	46	0.46%	262,297	12	0.11%	64,055
28	62791	616	6.21%	3,512,497	614	5.79%	3,277,464
29	63015	9	0.09%	51,319	0	0.00%	0
30	63057	19	0.19%	108,340	0	0.00%	0
31	63387	2276	22.94%	12,977,991	2481	23.41%	13,243,303
32	63394	0	0.00%	0	0	0.00%	0
33	65913	36	0.36%	205,276	0	0.00%	0
34	65584	255	2.57%	1,454,037	0	0.00%	0
35	65918	1831	18.45%	10,440,554	1817	17.14%	9,698,944
36	66022	238	2.40%	1,357,101	474	4.47%	2,530,159
37	66105	605	6.10%	3,449,774	167	1.58%	891,427
38	66894	22	0.22%	125,446	0	0.00%	0
39	68132	17	0.17%	96,936	10	0.09%	53,379
40	68193	45	0.45%	256,595	0	0.00%	0
41	68266	85	0.86%	484,679	0	0.00%	0
42	68335	12	0.12%	68,425	0	0.00%	0
43	68370	94	0.95%	535,998	100	0.94%	533,789
44	68407	10	0.10%	57,021	11	0.10%	58,717
45	68439	14	0.14%	79,829	0	0.00%	0
46	68482	18	0.18%	102,638	17	0.16%	90,744
47	68553	157	1.58%	895,230	0	0.00%	0
48	68562	142	1.43%	809,699	52	0.49%	277,570
49	68711	20	0.20%	114,042	0	0.00%	0
50	70240	25	0.25%	142,553	0	0.00%	0
51	82630	46	0.46%	262,297	5	0.05%	26,689
52	OTHUIC	0	0.00%	0	2501	23.60%	13,350,061
	<b>TOTAL</b>	<b>9922</b>	<b>100.00%</b>	<b>\$56,576,287</b>	<b>10599</b>	<b>100.00%</b>	<b>\$56,576,284</b>

### Alternate Allocation Basis (Using DMDC People #)

ACTIVITY NUM	UIC	TOTAL SQ-FT	% OF TOT	DMDC		% OF TOT	PEOPLE		% OF TOT
				PEOPLE	% OF TOT		SQ-FT	OF TOT	
1	00030	0	0.00%	0	0.00%		0	0.00%	
2	00242	18388	0.40%	0	0.00%	18388	0.20%		
3	00244	282669	6.15%	0	0.00%	282669	3.07%		
4	00245	2481469	53.97%	1469	13.86%	3118774	33.91%		
5	00247	190861	4.15%	0	0.00%	190861	2.08%		
6	00259	25920	0.56%	0	0.00%	25920	0.28%		
7	0025A	8696	0.19%	100	0.94%	52080	0.57%		
8	0546A	14301	0.31%	51	0.48%	36427	0.40%		
9	13871	800	0.02%	119	1.12%	52426	0.57%		
10	31557	13720	0.30%	6	0.06%	16323	0.18%		
11	35612	50551	1.10%	0	0.00%	50551	0.55%		
12	35720	0	0.00%	29	0.27%	12581	0.14%		
13	39049	5680	0.12%	0	0.00%	5680	0.06%		
14	39354	64416	1.40%	54	0.51%	87843	0.96%		
15	42980	0	0.00%	18	0.17%	7809	0.08%		
16	43435	0	0.00%	0	0.00%	0	0.00%		
17	45020	50800	1.10%	266	2.51%	166200	1.81%		
18	46276	0	0.00%	0	0.00%	0	0.00%		
19	52739	261	0.01%	42	0.40%	18482	0.20%		
20	53824	159443	3.47%	0	0.00%	159443	1.73%		
21	53997	18781	0.41%	34	0.32%	33531	0.36%		
22	55304	12508	0.27%	79	0.75%	46781	0.51%		
23	57049	0	0.00%	0	0.00%	0	0.00%		
24	60681	9280	0.20%	0	0.00%	9280	0.10%		
25	61690	418958	9.11%	71	0.67%	449760	4.89%		
26	62706	35043	0.76%	0	0.00%	35043	0.38%		
27	62888	0	0.00%	12	0.11%	5206	0.06%		
28	62791	39419	0.86%	614	5.79%	305794	3.33%		
29	63015	17555	0.38%	0	0.00%	17555	0.19%		
30	63057	18972	0.41%	0	0.00%	18972	0.21%		
31	63387	17611	0.38%	2481	23.41%	1093957	11.90%		
32	63394	700	0.02%	0	0.00%	700	0.01%		
33	65913	0	0.00%	0	0.00%	0	0.00%		
34	65584	14915	0.32%	0	0.00%	14915	0.16%		
35	65918	10290	0.22%	1817	17.14%	798570	8.68%		
36	66022	67126	1.46%	474	4.47%	272764	2.97%		
37	66105	331406	7.21%	167	1.58%	403857	4.39%		
38	66894	12960	0.28%	0	0.00%	12960	0.14%		
39	68132	12960	0.28%	10	0.09%	17298	0.19%		
40	68193	0	0.00%	0	0.00%	0	0.00%		
41	68266	96490	2.10%	0	0.00%	96490	1.05%		
42	68335	0	0.00%	0	0.00%	0	0.00%		
43	68370	45672	0.99%	100	0.94%	89056	0.97%		
44	68407	0	0.00%	11	0.10%	4772	0.05%		
45	68439	16016	0.35%	0	0.00%	16016	0.17%		
46	68482	0	0.00%	17	0.16%	7375	0.08%		
47	68553	448	0.01%	0	0.00%	448	0.00%		
48	68562	25920	0.56%	52	0.49%	48479	0.53%		
49	68711	0	0.00%	0	0.00%	0	0.00%		
50	70240	7220	0.16%	0	0.00%	7220	0.08%		
51	82630	0	0.00%	5	0.05%	2169	0.02%		
52	OTHUIC	0	0.00%	2501	23.60%	1085023	11.80%		
		<b>TOTAL</b>	<b>4598225</b>	<b>100.00%</b>	<b>10599</b>	<b>100.00%</b>	<b>9196448</b>	<b>100.00%</b>	

**Allocated Costs (Using SDNS People #)**

ACTIVITY NUM	COMAND UIC	PERSNL	TRANSPOT REAL PRO			SECURITY	TOT UIC	ALOCTN
			\$5,827,341	\$11,234,721	\$3,138,007			
1	00030	\$3,230	\$12,455	\$3,479	\$0	\$4,047	\$23,211	
2	00242	21,049	36,234	10,121	116,270	26,371	\$210,045	
3	00244	254,877	292,134	81,597	1,787,364	319,327	\$2,735,299	
4	00245	1,829,042	989,634	276,418	15,690,745	2,291,542	\$21,077,381	
5	00247	305,062	709,955	198,300	1,206,846	382,202	\$2,802,365	
6	00259	16,424	0	0	163,897	20,577	\$200,898	
7	0025A	43,392	146,067	40,799	54,986	54,364	\$339,608	
8	0546A	24,626	60,012	16,762	90,428	30,853	\$222,681	
9	13871	34,571	131,347	36,687	5,059	43,313	\$250,977	
10	31557	8,694	0	0	86,754	10,892	\$106,340	
11	35612	33,206	4,529	1,265	319,642	41,603	\$400,245	
12	35720	9,104	35,101	9,804	0	11,406	\$65,415	
13	39049	8,885	20,381	5,693	35,916	11,132	\$82,007	
14	39354	57,262	63,409	17,711	407,313	71,741	\$617,436	
15	42980	13,215	50,954	14,232	0	16,556	\$94,957	
16	43435	14,683	56,615	15,813	0	18,396	\$105,507	
17	45020	61,555	113,230	31,627	321,217	77,121	\$604,750	
18	46276	11,453	44,160	12,334	0	14,349	\$82,296	
19	52739	165	0	0	1,650	207	\$2,022	
20	53824	120,706	75,864	21,190	1,008,185	151,228	\$1,377,173	
21	53997	18,067	23,778	6,642	118,755	22,636	\$189,878	
22	55304	34,649	103,040	28,780	79,090	43,410	\$288,969	
23	57049	1,175	4,529	1,265	0	1,472	\$8,441	
24	60681	5,880	0	0	58,679	7,367	\$71,926	
25	61690	438,144	665,795	185,965	2,649,142	548,935	\$4,487,981	
26	62706	42,761	79,261	22,139	221,583	53,574	\$419,318	
27	62888	13,508	52,086	14,548	0	16,924	\$97,066	
28	62791	205,871	697,499	194,821	249,253	257,928	\$1,605,372	
29	63015	13,767	10,191	2,846	111,003	17,248	\$155,055	
30	63057	17,601	21,514	6,009	119,963	22,052	\$187,139	
31	63387	679,524	2,577,124	719,825	111,357	851,351	\$4,939,181	
32	63394	444	0	0	4,426	556	\$5,426	
33	65913	10,572	40,763	11,386	0	13,245	\$75,966	
34	65584	84,334	288,738	80,648	94,310	105,659	\$653,689	
35	65918	544,207	2,073,249	579,086	65,065	681,818	\$3,943,425	
36	66022	112,425	269,488	75,272	424,449	140,853	\$1,022,487	
37	66105	387,659	685,044	191,342	2,095,536	485,684	\$3,845,265	
38	66894	14,673	24,911	6,958	81,948	18,383	\$146,873	
39	68132	13,204	19,249	5,377	81,948	16,543	\$136,321	
40	68193	13,215	50,954	14,232	0	16,556	\$94,957	
41	68266	86,102	96,246	26,883	610,122	107,874	\$927,227	
42	68335	3,524	13,588	3,795	0	4,415	\$25,322	
43	68370	56,544	106,437	29,729	288,792	70,842	\$552,344	
44	68407	2,936	11,323	3,163	0	3,679	\$21,101	
45	68439	14,260	15,852	4,428	101,272	17,865	\$153,677	
46	68482	5,286	20,381	5,693	0	6,623	\$37,983	
47	68553	46,388	177,772	49,654	2,833	58,118	\$334,765	
48	68562	58,124	160,787	44,910	163,897	72,821	\$500,539	
49	68711	5,873	22,646	6,325	0	7,358	\$42,202	
50	70240	11,916	28,308	7,907	45,653	14,930	\$108,714	
51	82630	13,508	52,086	14,548	0	16,924	\$97,066	
52	OTHUIC	0	0	0	0	0	\$0	
	<b>TOTAL</b>	<b>\$5,827,342</b>	<b>\$11,234,720</b>	<b>\$3,138,008</b>	<b>\$39,075,348</b>	<b>\$7,300,870</b>	<b>\$56,576,288</b>	

### Alternate Allocation Basis (Using DMDC People #)

ACTIVITY NUM	UIC	TOTAL SQ-FT	% OF TOT	DMDC PEOPLE		% OF TOT	PEOPLE SQ-FT		% OF TOT
				OF TOT	PEOPLE		SQ-FT	OF TOT	
1	00030	0	0.00%	0	0.00%	0	0	0.00%	
2	00242	18388	0.40%	0	0.00%	18388	0.20%		
3	00244	282669	6.15%	0	0.00%	282669	3.07%		
4	00245	2481469	53.97%	1469	13.86%	3118774	33.91%		
5	00247	190861	4.15%	0	0.00%	190861	2.08%		
6	00259	25920	0.56%	0	0.00%	25920	0.28%		
7	0025A	8696	0.19%	100	0.94%	52080	0.57%		
8	0546A	14301	0.31%	51	0.48%	36427	0.40%		
9	13871	800	0.02%	119	1.12%	52426	0.57%		
10	31557	13720	0.30%	6	0.06%	16323	0.18%		
11	35612	50551	1.10%	0	0.00%	50551	0.55%		
12	35720	0	0.00%	29	0.27%	12581	0.14%		
13	39049	5680	0.12%	0	0.00%	5680	0.06%		
14	39354	64416	1.40%	54	0.51%	87843	0.96%		
15	42980	0	0.00%	18	0.17%	7809	0.08%		
16	43435	0	0.00%	0	0.00%	0	0.00%		
17	45020	50800	1.10%	266	2.51%	166200	1.81%		
18	46276	0	0.00%	0	0.00%	0	0.00%		
19	52739	261	0.01%	42	0.40%	18482	0.20%		
20	53824	159443	3.47%	0	0.00%	159443	1.73%		
21	53997	18781	0.41%	34	0.32%	33531	0.36%		
22	55304	12508	0.27%	79	0.75%	46781	0.51%		
23	57049	0	0.00%	0	0.00%	0	0.00%		
24	60681	9280	0.20%	0	0.00%	9280	0.10%		
25	61690	418958	9.11%	71	0.67%	449760	4.89%		
26	62706	35043	0.76%	0	0.00%	35043	0.38%		
27	62888	0	0.00%	12	0.11%	5206	0.06%		
28	62791	39419	0.86%	614	5.79%	305794	3.33%		
29	63015	17555	0.38%	0	0.00%	17555	0.19%		
30	63057	18972	0.41%	0	0.00%	18972	0.21%		
31	63387	17611	0.38%	2481	23.41%	1093957	11.90%		
32	63394	700	0.02%	0	0.00%	700	0.01%		
33	65913	0	0.00%	0	0.00%	0	0.00%		
34	65584	14915	0.32%	0	0.00%	14915	0.16%		
35	65918	10290	0.22%	1817	17.14%	798570	8.68%		
36	66022	67126	1.46%	474	4.47%	272764	2.97%		
37	66105	331406	7.21%	167	1.58%	403857	4.39%		
38	66894	12960	0.28%	0	0.00%	12960	0.14%		
39	68132	12960	0.28%	10	0.09%	17298	0.19%		
40	68193	0	0.00%	0	0.00%	0	0.00%		
41	68266	96490	2.10%	0	0.00%	96490	1.05%		
42	68335	0	0.00%	0	0.00%	0	0.00%		
43	68370	45672	0.99%	100	0.94%	89056	0.97%		
44	68407	0	0.00%	11	0.10%	4772	0.05%		
45	68439	16016	0.35%	0	0.00%	16016	0.17%		
46	68482	0	0.00%	17	0.16%	7375	0.08%		
47	68553	448	0.01%	0	0.00%	448	0.00%		
48	68562	25920	0.56%	52	0.49%	48479	0.53%		
49	68711	0	0.00%	0	0.00%	0	0.00%		
50	70240	7220	0.16%	0	0.00%	7220	0.08%		
51	82630	0	0.00%	5	0.05%	2169	0.02%		
52	OTHUIC	0	0.00%	2501	23.60%	1085023	11.80%		
		<b>TOTAL</b>	<b>4598225</b>	<b>100.00%</b>	<b>10599</b>	<b>100.00%</b>	<b>9196448</b>	<b>100.00%</b>	

**Allocated Costs (Using DMDC People #)**

ACTIVITY NUM	COMAND UIC	PERSONL \$0	TRANSPOT \$0	REAL PRO \$0	SECURITY \$0	TOT DL \$0	ALOCATN
1	00030	\$0	\$0	\$0	\$0	\$0	\$0
2	00242	11,652	0	0	116,270	14,598	\$142,520
3	00244	179,114	0	0	1,787,364	224,405	\$2,190,883
4	00245	1,976,215	1,557,110	434,921	15,690,745	2,475,930	\$22,134,921
5	00247	120,939	0	0	1,206,846	151,521	\$1,479,306
6	00259	16,424	0	0	163,897	20,577	\$200,898
7	0025A	33,001	105,998	29,607	54,986	41,345	\$264,937
8	0546A	23,082	54,059	15,099	90,428	28,919	\$211,587
9	13871	33,220	126,138	35,232	5,059	41,620	\$241,269
10	31557	10,343	6,360	1,776	86,754	12,958	\$118,191
11	35612	32,032	0	0	319,642	40,131	\$391,805
12	35720	7,972	30,739	8,586	0	9,988	\$57,285
13	39049	3,599	0	0	35,916	4,509	\$44,024
14	39354	55,662	57,239	15,988	407,313	69,737	\$605,939
15	42980	4,948	19,080	5,329	0	6,199	\$35,556
16	43435	0	0	0	0	0	\$0
17	45020	105,313	281,955	78,754	321,217	131,943	\$919,182
18	46276	0	0	0	0	0	\$0
19	52739	11,711	44,519	12,435	1,650	14,672	\$84,987
20	53824	101,031	0	0	1,008,185	126,578	\$1,235,794
21	53997	21,247	36,039	10,066	118,755	26,620	\$212,727
22	55304	29,643	83,738	23,389	79,090	37,138	\$252,998
23	57049	0	0	0	0	0	\$0
24	60681	5,880	0	0	58,679	7,367	\$71,926
25	61690	284,991	75,259	21,021	2,649,142	357,055	\$3,387,468
26	62706	22,205	0	0	221,583	27,820	\$271,608
27	62888	3,299	12,720	3,553	0	4,133	\$23,705
28	62791	193,767	650,827	181,785	249,253	242,763	\$1,518,395
29	63015	11,124	0	0	111,003	13,937	\$136,064
30	63057	12,022	0	0	119,963	15,061	\$147,046
31	63387	693,187	2,629,809	734,541	111,357	868,470	\$5,037,364
32	63394	444	0	0	4,426	556	\$5,426
33	65913	0	0	0	0	0	\$0
34	65584	9,451	0	0	94,310	11,841	\$115,602
35	65918	506,015	1,925,982	537,953	65,065	633,968	\$3,668,983
36	66022	172,837	502,430	140,335	424,449	216,542	\$1,456,593
37	66105	255,905	177,017	49,443	2,095,536	320,614	\$2,898,515
38	66894	8,212	0	0	81,948	10,289	\$100,449
39	68132	10,961	10,600	2,961	81,948	13,733	\$120,203
40	68193	0	0	0	0	0	\$0
41	68266	61,141	0	0	610,122	76,601	\$747,864
42	68335	0	0	0	0	0	\$0
43	68370	56,430	105,998	29,607	288,792	70,700	\$551,527
44	68407	3,024	11,660	3,257	0	3,788	\$21,729
45	68439	10,149	0	0	101,272	12,715	\$124,136
46	68482	4,673	18,020	5,033	0	5,855	\$33,581
47	68553	284	0	0	2,833	356	\$3,473
48	68562	30,719	55,119	15,395	163,897	38,486	\$303,616
49	68711	0	0	0	0	0	\$0
50	70240	4,575	0	0	45,653	5,732	\$55,960
51	82630	1,374	5,300	1,480	0	1,722	\$9,876
52	OTHUIC	687,526	2,651,008	740,462	0	861,377	\$4,940,373
	<b>TOTAL</b>	<b>\$5,827,343</b>	<b>\$11,234,723</b>	<b>\$3,138,008</b>	<b>\$79,075,348</b>	<b>\$7,300,869</b>	<b>\$56,576,291</b>

## APPENDIX E

### San Diego Naval Supply Center Data

This Appendix provides a summary of the data collected at the San Diego Naval Supply Center. The data was used to analyze reports provided by the Defense Manpower Data Center, Monterey, California and to examine the OSD directed method of allocating BOS costs. The data includes:

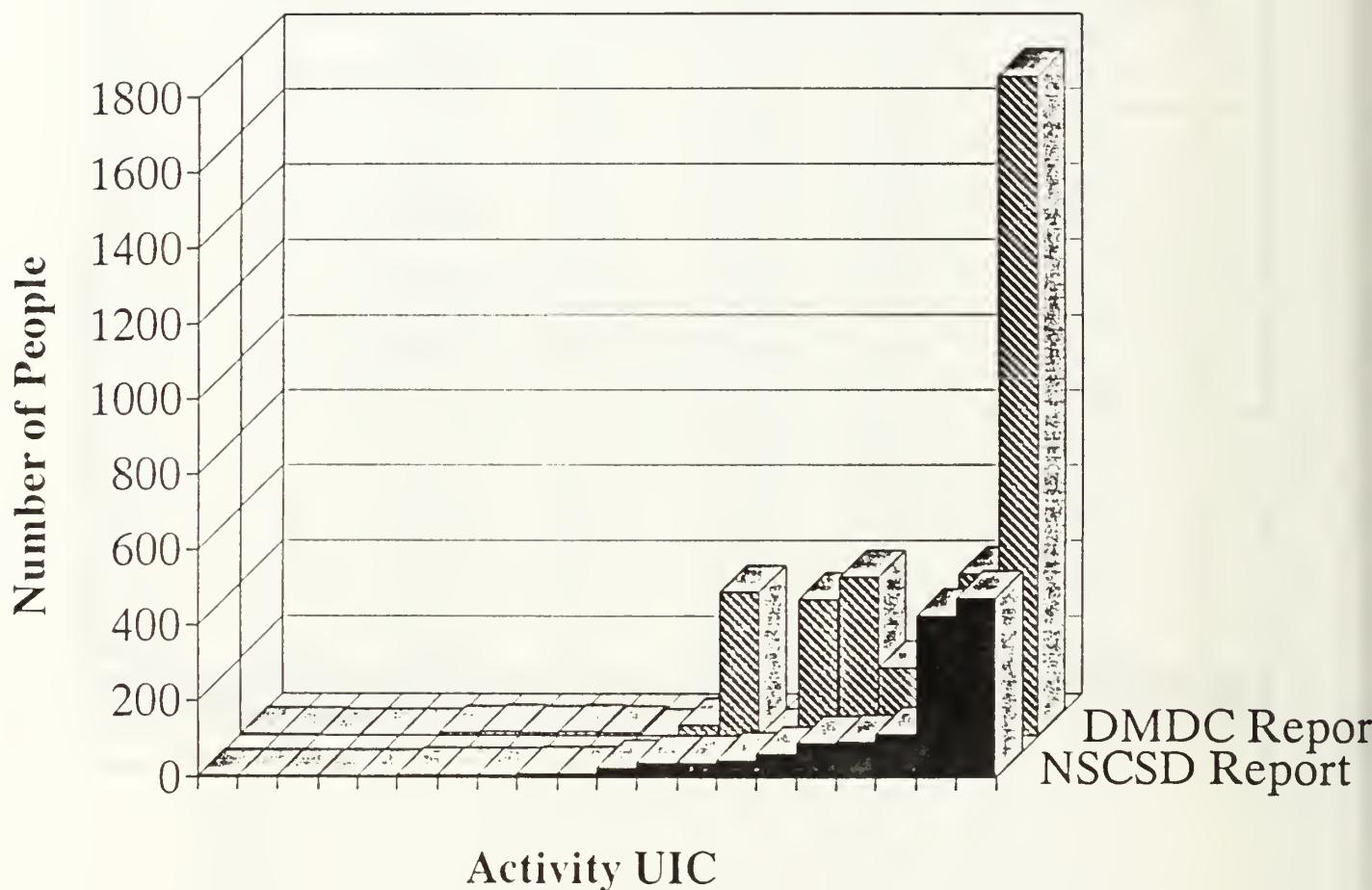
<u>Item</u>	<u>Description</u>
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(1)	Summary SDNS data
(2)	DMDC versus SDNS People Graph

# Naval Supply Center, San Diego (UIC N00244)

ACTIVITY NUM	UIC	TOTAL SQ-FT	% OF TOT	RPTD PEOPLE	% OF TOT	DMDC PEOPLE	% OF TOT
1	0001A	975	0.08%	44	3.04%	0	0.00%
2	00037	3533	0.28%	3	0.21%	0	0.00%
3	00123	28301	2.27%	93	6.42%	179	3.71%
4	00242	26276	2.11%	60	4.14%	358	7.42%
5	00244	927701	74.35%	473	32.67%	1741	36.08%
6	00245	1835	0.15%	2	0.14%	0	0.00%
7	0061A	0	0.00%	9	0.62%	9	0.19%
8	35612	29077	2.33%	4	0.28%	8	0.17%
9	43435	3733	0.30%	6	0.41%	6	0.12%
10	45189	2280	0.18%	10	0.69%	7	0.15%
11	60957	72293	5.79%	427	29.49%	427	8.85%
12	61339	25562	2.05%	24	1.66%	0	0.00%
13	62706	1032	0.08%	3	0.21%	0	0.00%
14	63015	37352	2.99%	113	7.80%	228	4.72%
15	66022	1816	0.15%	3	0.21%	0	0.00%
16	67796	1053	0.08%	1	0.07%	1	0.02%
17	68152	3029	0.24%	4	0.28%	7	0.15%
18	68350	27986	2.24%	39	2.69%	24	0.50%
19	68553	7478	0.60%	39	2.69%	379	7.85%
20	70240	46452	3.72%	91	6.28%	416	8.62%
21	OTHUIC	0	0.00%	0	0.00%	1036	21.47%
<b>TOTAL</b>		<b>1247764</b>	<b>100.00%</b>	<b>1448</b>	<b>100.00%</b>	<b>4826</b>	<b>100.00%</b>

## People Numbers DMDC versus NSCSD Data



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